

Report No. FHWA-RD-72-38

69

AIR QUALITY MANUAL. Vol. VI.

**Analysis of Ambient Air Quality
for Highway Projects**

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**April 1972
Interim Report**

This document is available through the
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Springfield, Virginia 22151

**Prepared for
FEDERAL HIGHWAY ADMINISTRATION
Office of Research
Washington, D.C. 20590**

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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. FHWA-RD-72-38	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle AIR QUALITY MANUAL: Vol. VI. Analysis of Ambient Air Quality for Highway Projects		5. Report Date April 1972	
7. Author(s) John L. Beaton, Andrew J. Ranzieri, Earl C. Shirley and John B. Skog		6. Performing Organization Code	
9. Performing Organization Name and Address State of California Department of Public Works - Division of Highways 1120 N Street, P. O. Box 1139 Sacramento, California 95814		8. Performing Organization Report No. CA-HWY-MR6570825(5)-72-07	
12. Sponsoring Agency Name and Address U. S. Department of Transportation Federal Highway Administration Washington, D.C. 20590		10. Work Unit No. FCP 33F3032	
		11. Contract or Grant No. FH-11-7730	
		13. Type of Report and Period Covered Interim Report June 1971 thru April 1972	
14. Sponsoring Agency Code			
15. Supplementary Notes FHWA's project manager: Howard Jongedyk, HRS-42. This is the sixth in a series of 8 volumes under this same general title.			
16. Abstract Highway engineers must play an important role in the enhancement and protection of the environment. They will have to consider a variety of factors in the environmental impact of any highway project and complete a number of studies prior to writing an impact statement. One of these studies is concerned with the gathering of field data, analysis of such data, and writing an air quality report. This manual explains the interaction between air pollutant sources and meteorological conditions contributing to the ambient air quality of a community. Air pollutant sources within a highway corridor normally include stationary and mobile sources. Stationary sources include domestic heaters, industrial installations and power plants. Mobile sources include motor vehicle traffic on highways, local roads and streets. Guidelines are presented to: (1) determine the present ambient air quality along a proposed highway corridor from existing air monitoring station data, (2) determine the present ambient air quality by performing an on-site air quality survey, and (3) perform a mesoscale analysis of ambient air quality.			
17. Key Words Ambient air quality, Air pollution, Environmental effects, Environmental impact statements		18. Distribution Statement Availability unlimited. The public can obtain this document through the National Technical Information Service, Springfield, Virginia 22151	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 111	22. Price

Form DOT F 1700.7 (8-69)

FOREWORD

A number of studies must be completed prior to the writing of an Environmental Impact Statement for a highway project. One of these studies is concerned with the gathering of field data, analysis of such data, and writing an air quality report.

The California Division of Highways has embarked on a program of equipping and training district personnel to prepare air quality reports. This requires a two-week training course and the preparation of air quality manuals to be used as guides in the gathering of field data, analysis of results, and writing the report.

This volume is the sixth in a series of eight volumes, the titles of which follows:

1. Meteorology and Its Influence on the Dispersion of Pollutants from Highway Line Sources.
2. Motor Vehicle Emission Factors for Estimates of Highway Impact on Air Quality.
3. Traffic Information Requirements for Estimates of Highway Impact on Air Quality.
4. Mathematical Approach to Estimating Highway Impact on Air Quality.
5. Appendix to Volume 4.
6. Analysis of Ambient Air Quality for Highway Environmental Projects.
7. A Method for Analyzing and Reporting Highway Impact on Air Quality.
8. Synopsis of Air Quality.

The material presented in these volumes is subject to change as further research provides information. The following items are not discussed or, if presented, are subject to care in the interpretation of results.

1. There is no accepted emission factors for oxides of nitrogen relating emissions to speed.
2. There are no statistically validated photochemical models for different meteorological conditions which will permit calculations of oxidant formed downwind from a line source.
3. Further research is required to fully validate model calculations when winds blow parallel to the line source.

ACKNOWLEDGEMENTS

This manual has been authored by Andrew J. Ranzieri under the supervision of Earl C. Shirley, Senior Materials and Research Engineer, Environmental Improvement Section. Special appreciation is given to Bruce W. Oliver of the California Division of Highways for his efforts in reviewing this report.

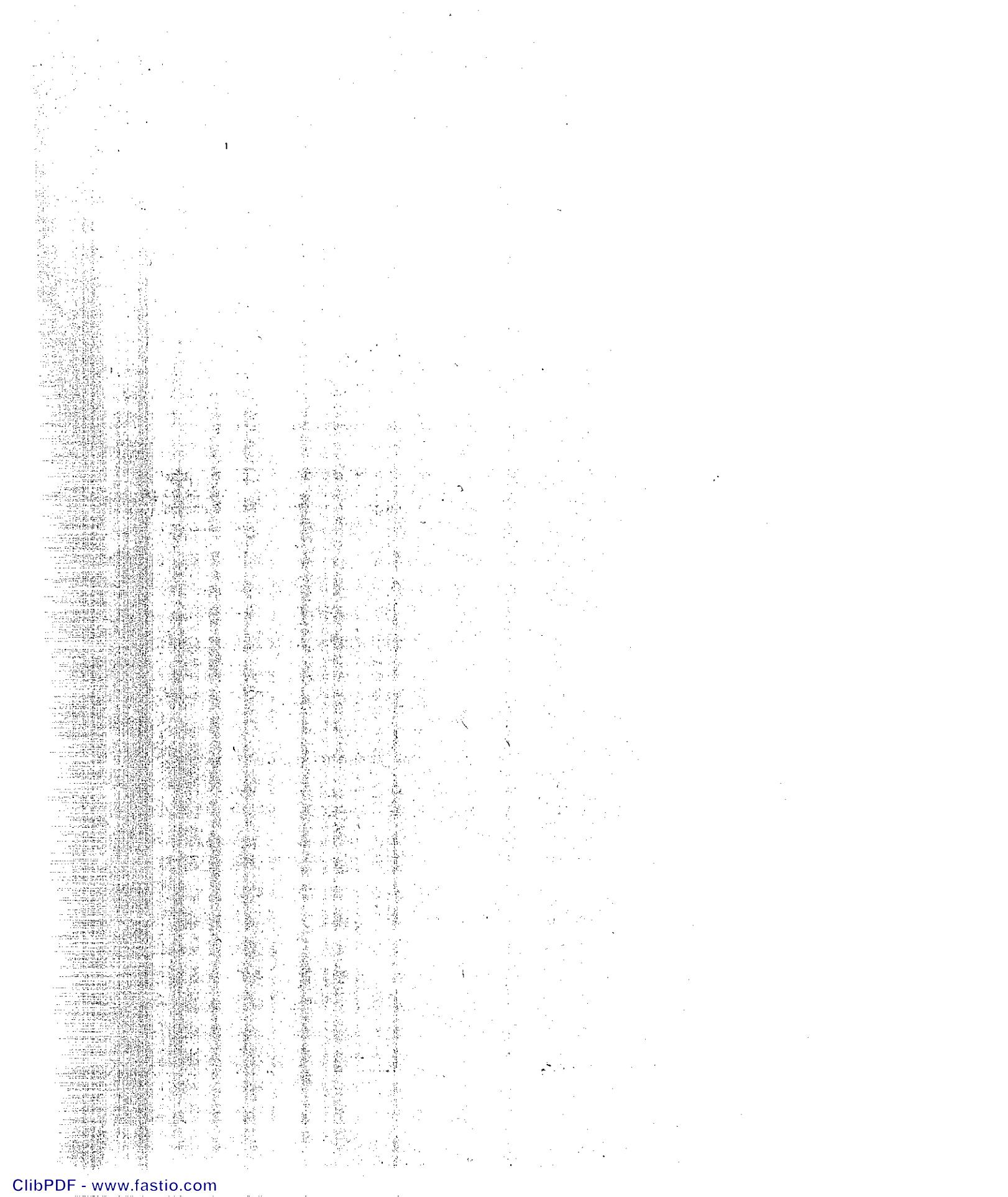
This work was accomplished in cooperation with the United States Department of Transportation, Federal Highway Administration. The opinions, findings, and conclusions expressed in this publication are those of the California Division of Highways and not necessarily those of the Federal Highway Administration.

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INTRODUCTION

Air pollution generally results from the interaction between pollutant sources and meteorological conditions. Sources of air pollutants within a highway corridor normally include stationary and mobile sources. Stationary sources may include domestic heaters, industrial installations, and power plants. Mobile sources include the motor vehicle traffic on freeways and local roads and streets. All sources contribute to the ambient air quality of a community.

The primary pollutants emitted from motor vehicles are carbon monoxide (CO), hydrocarbons (HC), oxides of nitrogen (NO_x) and particulates (mainly lead). Hydrocarbons and oxides of nitrogen combine in a photochemical process to form smog. The formation of photochemical smog is extremely complex and is related to the amount of ultraviolet radiation present, the relative concentrations of each primary pollutant, and the time for this reaction to take place. Carbon monoxide is a stable gas and does not take part in the photochemical process.

The California Air Resources Board (ARB) made studies [1] of the percentages of pollutant loads attributed to stationary and mobile sources for the Los Angeles Basin, San Diego, and the San Francisco Bay area. The average percentages of pollutant loads for these areas indicate that about 90%, 61%, and 64%, respectively, of CO, HC, and NO_x are attributed to motor vehicles.

The primary purpose in determining ambient air quality is to aid the planner to evaluate the impact of the proposed highway on the air environment in terms of existing air quality. The ambient pollution levels describe the air quality before a highway is constructed. The pollutants generated from future highway traffic are estimated from a highway line source dispersion model [2]. The total pollutant concentration within the highway corridor is the additive sum of ambient concentrations and highway generated pollutants.

The main objectives of this manual are to present guidelines to:

- 1) Determine the present ambient air quality along a proposed highway corridor from existing air monitoring station data.
- 2) Determine the present ambient air quality along a proposed highway corridor by performing an on-site air quality survey.
- 3) Perform a mesoscale analysis of ambient air quality.

OBTAINING AMBIENT AIR QUALITY INFORMATION FOR THE QUANTITATIVE AIR
QUALITY REPORT

Ambient air quality information may be obtained from existing monitoring stations or by the use of sampling procedures within the corridor of the proposed highway. In either case the data must be comparable with that derived from the highway line source dispersion model [2] in order to determine total pollutant concentrations.

Ambient air quality is directly related to meteorological conditions. In order to use the information in terms of the mathematical model [2], data must be collected at certain periods related to the traffic load. In summary, ambient air quality data should be collected and analyzed for the following time periods and meteorological conditions.

1. Peak traffic hours (A.M. and P.M.)
2. Free flow traffic hours.
3. Wind direction and speed associated with the most probable and worst meteorological conditions.

These conditions may be fulfilled by collecting and analyzing both ambient air quality and meteorological data for the periods, 7-9 A.M., 11-1 P.M. and 4-6 P.M. as described in detail below. Other time periods may be dictated in special circumstances.

Assurance that ambient air quality data are collected under similar meteorological conditions depends on the amount of meteorological data that are available. Ideally, to collect data for similar meteorological conditions, measurements of surface wind speeds, wind directions, and the vertical temperature structure (which is a measure of the base of ground or elevated inversions) are required. Measurements of the vertical temperature structure are generally made twice daily at 4 A.M. and 4 P.M. Presently, inversion measurements in California on a scheduled daily basis are made at (1) San Diego, (2) Los Angeles International Airport, (3) El Monte, (4) Oakland, (5) San Jose, (6) Sacramento, and (7) Fresno. The primary purpose for analyzing the inversion base is to determine the mixing depth or height of the "lid" for the dispersion of pollutants. This is directly related to ambient air quality*. The inversion height can be analyzed with a frequency analysis** using a 500 foot class interval, from the surface up to 3000 feet. From the frequency analysis, the

*It should also be stressed for mesoscale analysis that the mixing depth is a parameter used in other mathematical models [10][11] and [12]. However, at the present time the Division of Highways does not have a mesoscale analysis using the mixing depth as a direct input to estimate pollutant concentrations.

**For a complete discussion on frequency analysis see Appendix B.

most probable inversion base interval can be determined. This will represent the most probable meteorological condition in terms of mixing depth. This analysis should be made for the A.M. and P.M. measurement period. The worst meteorological condition in terms of mixing depth will be a surface based inversion. This corresponds to a class interval from the surface to 500 feet. This generally occurs for the A.M. period for all seasons of the year. For the P.M. measurements it is very probable that no surface based inversion will exist, especially during the spring, summer and fall seasons. If this is the case, the worst meteorological conditions are for the observations that occur in the class interval closest to the surface of the earth.

Once the mixing depth is determined, the surface wind speeds and directions must be considered. For the mathematical analysis of the impact of highways on the environment computer programs [7] STAROS* and WNDROS give prevailing wind speeds and directions for the most probable and worst surface atmospheric conditions. These are the wind speeds and directions that are used in the highway line source dispersion model [2].

Analyses of the most probable and lowest inversions base height, along with surface winds, will serve as guidelines for the collection of ambient air quality data. The following procedure is recommended to enable collecting ambient air quality data under similar meteorological conditions:

1. Perform a frequency analysis of the A.M. and P.M. inversion data if these are available. This will indicate height distribution of inversion bases. From this analysis calculate the most probable and the lowest inversion base height interval. This analysis should be made on a seasonal basis consistent with the guidelines presented in reference [7].
2. Perform a wind rose analysis [7]. This is the same analysis used in the mathematical model [2]. This gives the prevailing surface wind speeds and directions for the most probable and worst surface atmospheric conditions for time periods of interest throughout the day.
3. Collect air quality data under meteorological regimes corresponding to the most probable and lowest inversion base height intervals (Step 1), most probable and worst base wind directions and speeds (Step 2) for the time periods involved (A.M. and P.M. peak traffic).
4. Collect air quality data for off-peak traffic hours (mid-day) under conditions corresponding to the most probable and the lowest inversion height and for surface wind speeds and directions associated with this time period.

*The STAR2 computer program has replaced the STAROS program.

The data collected (based on this approach) can probably be analyzed numerically. A frequency analysis can also be used to supplement the numerical analysis. These forms of data analysis are discussed in detail later in this manual.

In many areas of California no measurements are made of the vertical temperature structure for determining inversion bases. For these areas the collection of ambient air quality data for similar meteorological conditions is very difficult. Until such time as the Division develops capability for inversion measurements, the following procedure can be used as a guideline:

1. Perform a wind rose analysis [7] (same as used in the mathematical model). The time periods should be generally for 7-9 A.M., 11 A.M.-1 P.M. and 4-6 P.M. This gives the prevailing surface wind speeds and directions for the most probable and worst surface meteorological conditions.
2. Collect air quality data corresponding to the time period for which the wind rose analyses were made and corresponding to the prevailing wind speeds and directions.

It is very probable that the distribution of the collected data will be skewed. If the data are skewed (data taken from different populations or insufficient data available) it is recommended that a frequency analysis be made as will be discussed later.

Existing Ambient Air Quality Data

There are various air pollution districts and organizations which have air monitoring systems to measure ambient air quality. These organizations will give assistance and guidance to the Division of Highways in the collection of existing ambient air quality data. Some organizations may have very limited records. Ambient air quality data can be obtained from:

- 1) California Air Resources Board (ARB)
- 2) Local Air Pollution Districts
- 3) State and local Departments of Public Health, private consultants, and various colleges and universities.

The California Air Resources Board publishes a quarterly report termed "California Air Quality Data". This report is a summary of all the data from the continuous air monitoring stations in California. Appendix A illustrates the summary of ambient

levels for June, July and August 1971. Copies of this report for other seasons of the year can be obtained from the Air Resources Board, whose address is as follows:

Air Resources Board
1025 P Street
Sacramento, CA 95814

Air pollution control districts in California:
Table 2 gives the locations and addresses of air pollution control districts in California that have air monitoring stations. Also indicated are the dates when the districts became activated. The list was obtained from the State Air Resources Board and stations are listed in alphabetical order.

TABLE 1

AIR POLLUTION CONTROL DISTRICTS
IN CALIFORNIA

BAY AREA APCD
939 Ellis Street
San Francisco, CA 94109
(415) 771-6000 Activated September 1955
Mr. J. D. Callagan
Chief Administrative Officer

CALAVERAS COUNTY APCD
Government Center
El Dorado Road
San Andreas, CA 95249
(209) 754-4251 Activated March 6, 1970
D. L. Albasio, M.D.*
Senior Sanitarian

COLUSA COUNTY APCS
County Court House
Colusa, CA 95932
(916) 458-4516 Activated June 3, 1969
Mr. Andrew R. Clark
Executive Secretary to Board of Supervisors

FRESNO COUNTY APCD
516 South Cedar Avenue
Fresno, CA 93702
(209) 485-8000 Activated August 8, 1968
William A. DeFries, M.D.*
Health Officer
Mr. R. E. Bergstrom**
Director of Environmental Sanitation

HUMBOLDT COUNTY APCD
5630 South Broadway
Eureka, CA 95501
(707) 443-3091 Activated February 4, 1964
Mr. Charles P. Sassenrath
Air Pollution Control Director

INYO COUNTY APCD
P. O. Box 218
Independence, CA 93526
(714) 878-2411 Activated May 18, 1970
Victor H. Hough, M.D.*
Health Officer
Walter S. Carrington, R.S.**
Director Division of Sanitation

KERN COUNTY APCD
P. O. Box 997
Bakersfield, CA 93302
(1700 Flower Street)
(805) 325-5051 Activated March 12, 1968
Owen A. Kearns, M.D.*
Health Officer
Mr. Citron Toy**
Senior Sanitarian

KINGS COUNTY APCD
1221 West Lacey Boulevard
Hanford, CA 93230
(209) 582-3211 Activated March 19, 1968
Douglas B. Wilson, M.D.*
Health Officer
Mr. Tony Maniscalo
Director of Sanitation

LOS ANGELES COUNTY APCD
434 South San Pedro Street
Los Angeles, CA 90013
(213) 629-4711 Activated October 14, 1947
Mr. Robert L. Chass
Control Officer

MADERA COUNTY APCD
216 West Sixth Street
Madera, CA 93637
(209) 674-4641 Activated June 11, 1968
Douglas F. Pratt**
Director of Sanitation
(Acting APCO)

MARIPOSA COUNTY APCD
P. O. Box 5
Mariposa, CA 95338
(on Hwy. 140, next door to Frosty Shop)
(209) 966-3689 Activated April 9, 1968
Robert John Evans, M.D.*
Acting Health Officer
Mr. Herb Davis**
Chairman, Board of Supervisors
County Court House
(209) 966-2396
Home (209) 966-2109

MERCED COUNTY APCD
P. O. Box 1350
Merced, CA 95341
(240 East 15th Street,
next to General Hospital)
(209) 723-2861 Activated January 14, 1969
A. Frank Brewer, M.D.*
Health Officer
Mr. Bill Norman**
Director of Sanitation

MONTEREY-SANTA CRUZ COUNTY UNIFIED APCD
P. O. Box 487
Salinas, CA 93901
(Courthouse)
(408) 758-3583 or 424-8611 Ext. 383
Activated July 1, 1968
Mr. Edward W. Munson
Control Officer

NEVADA COUNTY APCD
Willow Valley Road
East Basement Wing
Nevada City, CA 95959
(916) 265-2461 Ext. 264
Activated April 28, 1970
Peter J. Keenan, M.D.*
Health Officer
Mr. Hal Cox**
Senior Sanitarian

ORANGE COUNTY APCD
1010 South Harbor Boulevard
Anaheim, CA 92805
(714) 774-0284 Activated September 1950
Mr. William Fitchen
Control Officer

PLACER COUNTY APCD
155 Fulweiler Avenue
Auburn, CA 95603
(916) 885-4517 Activated March 3, 1970
Gordon Seck, M.D.*
Health Officer
Mr. Albert A. Marino**
Chief, Division of Environmental Health

PLUMAS COUNTY APCD
P. O. Box 207
Quincy, CA 95971
(916) 283-1800 Activated May 18, 1970
Robert H. Hunter**
Supervisor
William Cullen
Chief Sanitarian

RIVERSIDE COUNTY APCD
Room 234, Health-Finance Building
3575 Eleventh Street
Riverside, CA 92501
(714) 787-2416 Activated June 13, 1955

SACRAMENTO COUNTY APCD
2221 Stockton Boulevard
Sacramento, CA 95817
(916) 454-5458 Activated December 7, 1959
James T. Harrison, M.D.*
Director of Public Health
Mr. Philip S. Tow**
Chief, Division of Air Sanitation

SAN BERNARDINO COUNTY APCD
172 West Third Street
San Bernardino, CA 92401
(714) 889-0111, Ext. 376, 456, 548, 549
Activated June 19, 1956
Mr. John H. Fairweather
Control Officer

SAN DIEGO COUNTY APCD
Civic Center
1600 Pacific Highway
San Diego, CA 92101
(714) 239-7711 Activated May 1955
J. B. Askew, M.D.*
Health Officer
Mr. Clark L. Gaulding**
Chief, Air Pollution Control Services

SAN JOAQUIN COUNTY APCD
P. O. Box 2009
Stockton, CA 95201
(1601 East Hazelton Avenue)
(209) 466-6781 Activated May 9, 1967
Mr. J. Don Layson
Director of Environmental Health

SANTA CRUZ (See MONTEREY-SANTA CRUZ)

SAN LUIS OBISPO COUNTY APCD
P. O. Box 1499
San Luis Obispo, CA 93402
(2191 Johnson Avenue)
(805) 548-121 Activated April 6, 1970
Mr. Jim Gates**
Director of Sanitation

SONOMA COUNTY APCD
3313 Chante Road
Santa Rosa, CA 95404
(707) 527-1111 Activated March 30, 1970
Walter C. Clowers, M.D.*
Health Officer

STANISLAUS COUNTY APCD
902 Scenic Drive
Modesto, CA 95350
(209) 524-1251 Activated August 20, 1968
Robert S. Westphal, M.D.*
Health Officer
Mr. James Rankin**
Director of Sanitation

SUTTER COUNTY APCD
Department of Agriculture
142 Garden Way
Yuba City, CA 95991
(916) 742-3276 Activated July 28, 1969
William A. Greene*
Air Pollution Control Officer

TULARE COUNTY APCD
County Civic Center
Visalia, CA 93277
(209) 732-5511 Activated June 25, 1968
Lowell F. Chemberlen, M.D.*
Health Officer
Mr. Pete Hanson**
Director of Sanitation

VENTURA COUNTY APCD
3147 Loma Vista Road
Ventura, CA 93001
(805) 648-6181 Activated March 12, 1968
Stephen A. Coray, M.D.*
Health Officer
Mr. Richard B. Atherton**
Air Pollution Control Engineer

SAN BENITO COUNTY APCD
439 Fourth Street
Hollister, CA 95023
(408) 637-5367 Activated August 24, 1970
James G. Telfer, M.D.*
Director of Public Health

SANTA BARBARA COUNTY APCD
P. O. Box 119
4440 Calle Real
Santa Barbara, CA
(805) 967-2311 Activated September 14, 1970
Joseph T. Nardo, M.D.
Director of Public Health and Acting APCO

*Also appointed Air Pollution Control Officer
**In direct charge of Air Pollution Control Program

Problems in Using Existing Fixed Location Air Quality Data for a Distant Highway Location:

The primary purpose of air monitoring stations is to measure the representative ambient air quality for an area. The location where the sample is drawn is extremely important. Special attention must be given to the data from an air monitoring station when using this data for estimating the ambient air quality for a proposed highway. For example, an air monitoring station may be located within the downtown area of a community. Traffic in this area may be heavy and possibly congested. This station would measure the ambient air quality for the downtown area. However, if a proposed highway is to be located some distance away from the downtown air monitoring station, the question arises as to the applicability of those measurements to the ambient levels in the vicinity of the proposed highway. To answer this question special consideration should be given to the following:

- 1) Local stationary or mobile sources between the proposed highway and the air monitoring station.
- 2) Placement of the sensor in a location such that it is taking a representative air sample.
- 3) Changes in topography and terrain features between the proposed highway and air monitoring station.
- 4) Changes in meteorological conditions (wind speed and direction) between the air monitoring station and proposed highway route.
- 5) Natural removal processes of the atmosphere between the air monitoring station and the proposed highway route.

Studies made by Johnson [3] show that local aerodynamic effects on the air flow in street canyons and around buildings can sometimes cause CO concentrations to vary as much as a factor of 3 from one side of the street to the other. An air monitoring station may have the sensor located in a street canyon or around buildings. The ambient air quality measured may be biased and not representative of the proposed highway route.

Recent studies made by Ott [4] indicate that, in general, if a sensor is located sufficiently remote from city streets it may be expected to provide data representative of the general area rather than levels associated with specific sources. Ott [4] has also shown that ambient CO concentrations will not change significantly over an extensive area and that a single sensor properly located (about 200 feet from the nearest surface streets) can provide representative data for the entire area.

Topography can have a significant effect on the air quality at different locations within an area. Local channeling of the

surface winds may occur if hills are located between the air monitoring station and the proposed highway route. In this case the major part of the pollutants may be dispersed and transported by the channeling wind. This may possibly result in lower ambient air quality for the proposed highway route.

Measurements of HC, NO_x and O₃ at an air monitoring station may not be representative of the ambient air quality in the vicinity of the proposed highway route. The reason is that HC and NO₂ are involved in a photochemical reaction to form smog. O₃ is a product of this photochemical reaction. This reaction can occur within a period of 20 minutes to 2 hours [15] depending on the amount of HC and NO₂ present and the amount of ultraviolet radiation received from the sun. Another important reaction is that of nitric oxide (NO) and ozone which form nitrogen dioxide (NO₂).

Consider the following example: A proposed highway is located six miles downwind from an air monitoring station. Surface winds are light at 4 to 7 miles per hour. Are the concentrations of HC, NO₂ and O₃ measured at the air monitoring station representative of those at the location of the proposed highway?

With a wind speed of 4 mph, it would take pollutants approximately one and half hours of travel to reach the proposed highway. During this time interval, photochemical reaction may possibly occur, reducing the concentrations of HC and NO₂ while increasing the O₃ concentrations. The same thing would happen for a wind speed of 7 mph. Conversely, if the freeway were built, local ozone concentration would be considerably reduced due to the reaction of nitric oxide with ozone [9] which would result in an increase in the nitrogen dioxide concentration.

Therefore, special consideration is given to carbon monoxide in prediction of future air quality because it is a stable gas and is mostly attributed to motor vehicles.

The localized removal of material from the atmosphere may occur in a number of ways. Particles large enough and heavy enough will settle to the ground due to the action of gravity. Some gaseous pollutants may be removed by absorption upon particulate matter in the atmosphere or by chemical reactions changing the material into a new compound (photochemical smog). Absorption may also take place at the earth's surface or by vegetation. Impaction of particles onto buildings and vegetation and turbulent impaction upon the earth's surface are very significant removal processes.

All of the items discussed above should be given special consideration when analyzing data from a permanent or temporary air monitoring station when applied for the ambient level for the proposed highway route. It is recommended that before any data are obtained, a

field survey be made of the (1) air monitoring stations for proper location, (2) general sources within the area and (3) general topography and terrain features.

Ambient Air Quality Data to be Obtained from Existing Stations: Obtain from station data sheets the average hourly results for carbon monoxide, hydrocarbons, nitrogen dioxide, oxidant, particulates and lead. Record these data in the form shown in Figure 2 and evaluate as noted in the section on statistical analysis of ambient air quality data.

The State of California and recently the Environmental Protection Agency of the Federal Government have published ambient air quality standards. These standards are compared in Table 2. If comparisons are to be made with these standards one should carefully note the averaging time. As an example note that carbon monoxide has different maximum concentrations for different averaging times.

It should be stressed again that ambient air quality, in terms of use with the Division of Highways mathematical model [2] shall be stated in terms of hourly averages corresponding to the time periods of the meteorological data.

On-site Ambient Air Quality Survey

An ambient air quality survey is required when an air monitoring station is not located in the vicinity of the proposed highway or when such a station is not measuring representative levels as previously discussed. This survey may be performed by using a bag sampling method or a mobile van or a combination of both. The basic procedure detailed below applies to both sampling methods but at the present time the bag sampling method is stressed.

Table 2

AMBIENT AIR QUALITY STANDARDS
APPLICABLE IN CALIFORNIA

Pollutant	Averaging Time	California Standards		Federal Standards ⁴		
		Concentration ⁷	Method ¹	Primary ^{2,7}	Secondary ^{3,7}	Method ⁵
Photochemical Oxidants (Corrected for NO ₂)	1 hour	0.10 ppm (200 µg/m ³)	Neutral Buffered KI	160 µg/m ³ (0.08 ppm)	Same as Primary Std.	Chemiluminescent Method
Carbon Monoxide	12 hours	10 ppm (11 mg/m ³)	Non-Dispersive Infrared Spectroscopy	---	Same as Primary Standards	Non-Dispersive Infrared Spectroscopy
	8 hours	---		10 mg/m ³ (9 ppm)	Primary Standards	
	1 hour	40 ppm (46 mg/m ³)		40 mg/m ³ (35 ppm)		
Nitrogen Dioxide	Annual Average	---	Saltzman Method	100 µg/m ³ (0.05 ppm)	Same as Primary Standard	Colorimetric Method Using NaOH
	1 hour	0.25 ppm (470 µg/m ³)		---		
Sulfur Dioxide	Annual Average	---	Conductometric Method	80 µg/m ³ (0.03 ppm)	60 µg/m ³ (0.02 ppm)	Peraroseniline Method
	24 hours	0.04 ppm (105 µg/m ³)		365 µg/m ³ (0.14 ppm)	260 µg/m ³ (0.10 ppm)	
	3 hours	---		---	1300 µg/m ³ (0.5 ppm)	
	1 hour	0.5 ppm (1310 µg/m ³)		---	---	
Suspended Particulate Matter	Annual Geometric Mean	60 µg/m ³	High Volume Sampling	75 µg/m ³	60 µg/m ³	High Volume Sampling
	24 hours	100 µg/m ³		260 µg/m ³	150 µg/m ³	
Lead (Particulate)	30 Day Average	1.5 µg/m ³	High Volume Sampling, Dithizone Method	---	---	---
Hydrogen Sulfide	1 hour	0.03 ppm (42 µg/m ³)	Cadmium Hydroxide STReactan Method	---	---	---
Hydrocarbons (Corrected for Methane)	3 hours (6-9 a.m.)	---	---	160 µg/m ³ (0.24 ppm)	Same as Primary Standard	Flame Ionization Detection Using Gas Chromatography
Visibility Reducing Particles	1 observation	In sufficient amount to reduce the prevailing visibility ⁶ to 10 miles when the relative humidity is less than 70%		---	---	---

NOTES:

- Any equivalent procedure which can be shown to the satisfaction of the Air Resources Board to give equivalent results at or near the level of the air quality standard may be used.
- National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health. Each state must attain the primary standards no later than three years after that state's implementation plan is approved by the Environmental Protection Agency (EPA).
- National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Each state must attain the secondary standards within a "reasonable time" after implementation plan is approved by the EPA.
- Federal standards, other than those based on annual averages or annual geometric means, are not to be exceeded more than once per year.
- Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" to be approved by the EPA.
- Pervailing visibility is defined as the greatest visibility which is attained or surpassed around at least half of the horizon circle, but not necessarily in continuous sectors.
- Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 mm of mercury.
- Corrected for SO₂ in addition to NO₂.

At the present time, the California Division of Highways is completing two mobile vans for performing an ambient air quality survey. These vans will be equipped to measure carbon monoxide, hydrocarbons, nitrogen dioxide, oxidant, and particulates including lead. They will also be equipped with a wind system which will provide a record of meteorological conditions at the van during measurements.

The two vans will be field tested for six months to one year by two large urban districts: the San Francisco and Los Angeles areas. At the conclusion of this study, an addendum to this manual will be provided. This addendum will provide complete information on the operation of the van together with test methods and calibration procedures.

Sampling Procedures

The basic procedures for an ambient air quality survey are presented below:

1. Locate all existing air monitoring stations within the vicinity of the proposed highway. The exact locations of air monitoring stations can be obtained from the local air pollution district or the California Air Resources Board.
2. Consider the proper exposure of the air monitoring station. This applies to aerodynamic considerations in taking a representative air sample. This is extremely important if the air monitoring station is near a pollutant source.
3. Ambient air quality surveys will be made initially with bag samples. Each bag will be filled by a portable pump. The time to fill the bag should be one hour. This sampling time will not only tend to smooth out the instantaneous peaks, but will serve as a comparison to the state health standards for a one hour duration of exposure. The one hour sampling time will also reduce the manpower requirements for changing the sample bags. Hourly bag samples should be taken throughout the day beginning with morning peak traffic and continuing through the evening peak traffic hours.
4. To reduce the amount of time required for bag sampling in the vicinity of the proposed highway, a correlation of actual field measurements should be made with historical data from the nearest permanent air monitoring station. Before any ambient air quality survey is made, the air intake for the sample should be located near the permanent air monitoring station air intake. In this way both are sampling the same air and a correlation of the different analyzers and of the

different sampling procedures can be evaluated. This may require one to perhaps five days of measurement, depending on meteorological conditions, before a correlation can be made.

5. Once the correlation between the air monitoring station and field measurement has been established, the number of sampling sites must be considered. The exact number of sites will depend on the variety of homogeneous areas within the vicinity of the proposed highway corridor. Homogeneous areas can be selected on the basis of land use patterns, common meteorological regimes, types of highway design, and sensitive areas. Following are a few examples of each:

A. Land Use Patterns.

- 1) Forested areas
- 2) Agricultural areas
- 3) Urban areas
- 4) Industrial areas

B. Meteorological Regimes.

- 1) Effects of topography
- 2) Winds parallel to highway alignment
- 3) Winds not parallel to highway alignment
- 4) Localized drainage winds.

C. Highway Design Features.

- 1) Major highway interchanges
- 2) Location of peak traffic volumes on a given segment of a highway
- 3) Areas of possible potential traffic "bottlenecks"
- 4) Types of highway design
 - a) At grade section
 - b) Elevated sections
 - c) Cut sections
 - d) Fill sections
- 5) Metered ramps

D. Other areas where special consideration should be given to sampling are:

1) Sensitive receptor areas

- a) Schools
- b) Hospitals
- c) Parks for children's activities
- d) Convalescent Homes
- e) Residential areas

- 2) Areas where a freeway is located on a fill that crosses a valley or canyon which will influence the wind flow pattern immediately upwind and downwind for sea breezes and drainage winds.
 - 3) Any location where air pollution considerations are a special focus of public interest.
- All of these features should be considered and may be plotted on a map of the area. Ideally, air samples should be taken at each of the different homogeneous sections along the highway corridor. However, manpower requirements may possibly restrict the number of sampling sites to those which are the most critical areas along the proposed route.
6. After a field measurement program is established, all sites along the highway corridor should be sampled simultaneously over the same time period to provide a temporal and spatial distribution of pollutants.
 7. The exact location of the bag samples at each site should be sufficiently removed from any local point source, or street with traffic, to minimize non-representative samples. The bag samples should be taken 5 feet above the ground surface except where higher level receptors are found.
 8. The field measurements should be correlated with measurements made at the closest air monitoring station. This correlation (if it exists) should indicate the temporal trends at the air monitoring station corresponding to the temporal trends of the field measurements. Once this correlation is established along with the previously mentioned correlation of analyzers and sampling techniques, the historical records can be used to extrapolate ambient levels for other periods of the year. This approach can significantly reduce the number of bag samples required and is recommended if it is possible.
 9. If no correlation of temporal trends exists between the field measurements and the closest air monitoring station, a more extensive field measurement program is in order. This field measurement program should last at least one year to fully consider seasonal variation in pollutant levels. Field measurements are not necessarily required for every day of each month. If a nearby meteorological data source records cloud cover, ceiling height, wind speed, and direction, the probability of the surface atmospheric conditions can be estimated from computer programs STAROS or WINDROS [7]. This will serve as a guide to months having similar meteorological conditions and months having the worst meteorological conditions. During the months which have the greatest potential for air pollution, field measurements

of the ambient air quality should be made daily. During months with more favorable meteorological conditions, field measurements can possibly be reduced, except during an air pollution episode in which sampling should be done on a daily basis. As a guideline for reducing the number of days of sampling, historical air quality data (maximum hourly average concentrations) should be analyzed by month. For example it may be determined that during the month of January for the past ten years that sampling once every 3 days is 95% as accurate as daily sampling. The Materials and Research Department is currently investigating this approach and any questions regarding it should be directed to this office.

The bag sampling program should continue throughout the day from peak morning through peak evening traffic hours. This approach may change depending on available manpower. Special cases may warrant 24 hour monitoring depending on receptor's location with respect to the highway route. In the absence of any meteorological source to give surface atmospheric stabilities, consult with the Materials and Research Department in Sacramento for guidance and assistance for evaluating the months for the greatest air pollution potential.

10. All the ambient air quality data from the field program should be summarized for a one hour averaging time. Concentration contours can be plotted on a map of the area indicating any possible high concentration areas.

Figure 1 shows a flow chart for an ambient air quality survey.

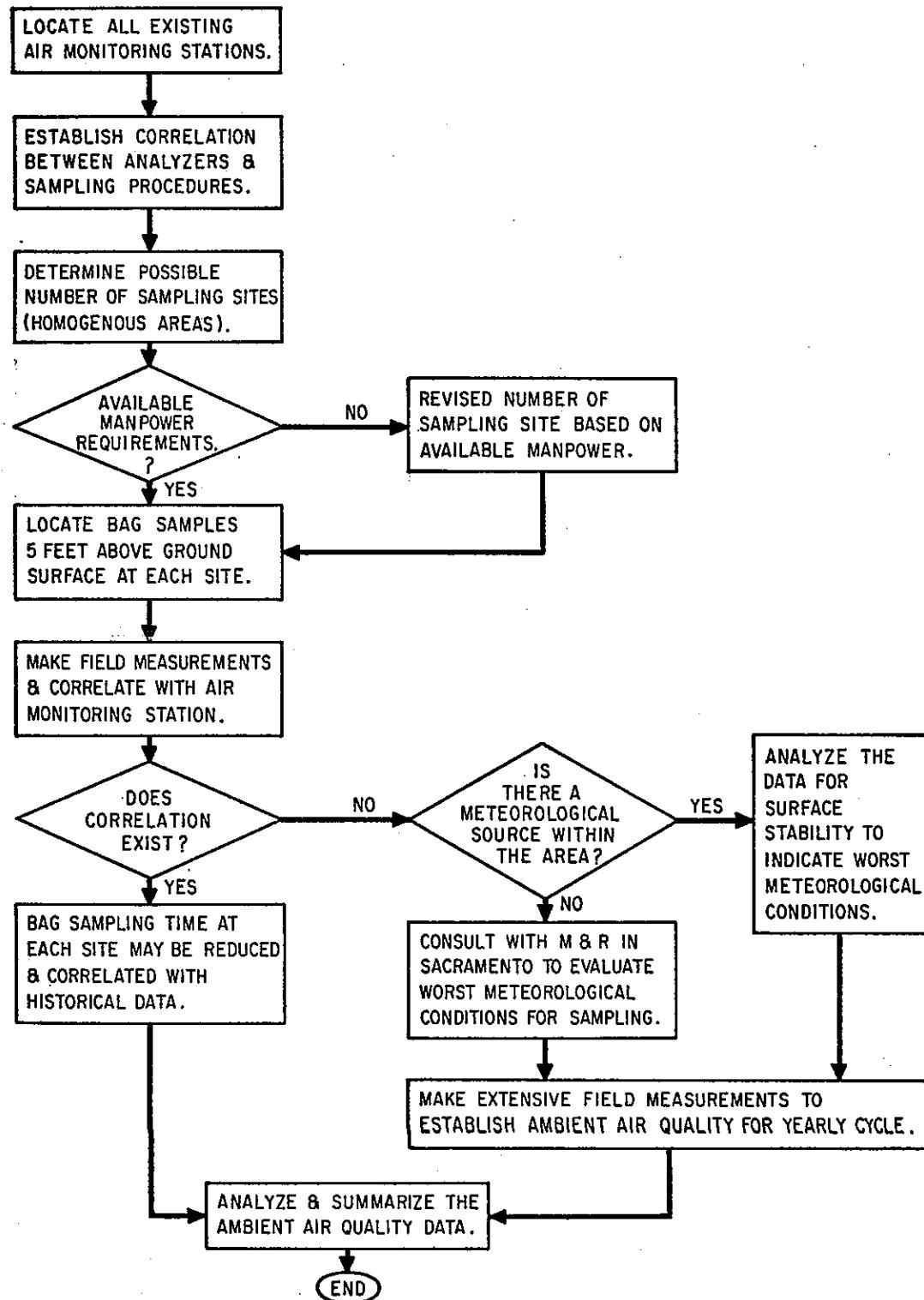


Figure 1 FLOW CHART FOR AN AMBIENT AIR QUALITY SURVEY

Statistical Analysis of Ambient Air Quality Data

The primary purpose in collecting and analyzing ambient air quality data is to obtain a representative estimate of existing air quality within the project area. Air quality can have considerable temporal variation depending on the meteorological conditions and upon the growth of the community. The meteorological conditions that significantly influence air quality are (1) wind speed, (2) wind direction, (3) surface based inversions, and (4) elevated inversions. These meteorological conditions must be considered when collecting and analyzing air quality data. When using the highway line source dispersion model [2], the concentrations of pollutants are estimated for the most probable as well as for the worst surface meteorological conditions. This involves a particular stability class associated with a prevailing wind speed and direction. To obtain representative air quality data, the samples must be collected under similar meteorological conditions. This will make possible a statistical analysis using data taken from the same population.

Data may be presented either graphically (or tabular) or numerically. The following describes each type of presentation:

I. Graphical or Tabular Presentation

- a. Frequency distribution
- b. Relative frequency distribution
- c. Cumulative frequency distribution
- d. Relative cumulative frequency distribution
- e. Histograms

II. Numerical Presentation

- a. Central tendency
- b. Dispersion

When analyzing aerometric data, there are various statistical distributions of pollutant concentrations that may exist.* One possible distribution is the gaussian or normal distribution which is characterized by a mean and a standard deviation. These are measures of the central point and spread of the bell shape distribution curve. Much of the data analyzed on air pollutant concentrations indicate that a normal distribution is usually not characteristic [13] and [14].

Larsen [15] has shown that the lognormal distribution more accurately describes the pollutant concentrations measured in the atmosphere. In the lognormal distribution the concentrations must be transformed to their logarithms of base 10. Once this transformation has been

*The following discussion was extracted and summarized from a paper "Simplified Methods for Statistical Interpretation of Monitoring Data" by B. E. Saltzman.

made, a statistical analysis of the data can be performed. Antilogarithm of the mean logarithm is then known as the geometric mean. The antilogarithm of the standard deviation of the logarithms is known as the standard geometric deviation.

The easiest method of examining the data distribution is by plotting on logarithmic probability paper. The cumulative frequency distribution is plotted. If the numbers follow a lognormal distribution, a straight line can be fitted to the data. The concentration related to the 50% value is the geometric mean. The slope of the line is a measure of the standard geometric deviation. The standard geometric deviation is numerically equal to the ratio of the 15.85% concentration to the 50% concentration.

In drawing the line of best fit, more attention should be given to points near the center of the distribution than those near the extremes. Tails are bound to show scatter since the actual number of observations in that region is usually small.

It should be stressed that lognormal distribution is applicable only if the sampling is random. The concentrations of pollutants in the atmosphere fluctuate in cycles depending on meteorological conditions. Random samples of pollutant must be collected over a period of time long enough to include many cycles. Sampling over a period as long as one month can in some cases deviate seriously from random sampling relationships. When neither the normal nor the lognormal distributions are representative of the data the use of nonparametric statistics is recommended. In this case, no assumptions are made about the underlying distribution of the data, and it is assumed the observations are made independent of each other.

Some of the advantages of nonparametric statistics [13] are:
(1) they are more appropriate for non-random data (2) statistical tests are more desirable especially with small samples and (3) effects of outliers are minimized. It should be stressed that if the underlying distribution is known, the use of a nonparametric analysis is not the best approach. Under these conditions the use of classical statistics is recommended.

In the analysis of ambient air quality data the mean and standard deviation are calculated from the same set of data and then the t_{n-1} distribution is applied to determine the confidence interval of the mean. The following equation can be used:

$$\text{Confidence Interval} = \bar{X} \pm t_{n-1} \left[\frac{s}{\sqrt{n}} \right] \quad (1)$$

where \bar{X} = mean

s = standard deviation

n = number of samples

t_{n-1} = tabulated statistic for various confidence limits and degrees of freedom.

Example calculations of confidence intervals are presented in Appendix B.

At the present time the Division of Highways is developing an additional training manual on the procedures and applications of nonparametric statistics in analyzing aerometric data. Until this manual is completed the above procedures should be followed when analyzing aerometric data in environmental impact reports.

If sufficient data are available, it is recommended that a numerical analysis be made. However, in many cases, lack of historical data or data collected from different meteorological regimes may result in skewed distribution of the data. For this condition a frequency analysis should be made along with numerical averages for a given meteorological condition. Appendix B describes in detail the graphical and numerical analysis. Figure 2 shows a work sheet for logging air quality data for statistical analysis.

DATA RETRIEVAL NO: _____

STATION NAME: _____ **LOCATION** _____

MONTH: _____ **YEAR:** _____ **TIME** _____

Fig.2 WORK SHEET FOR COLLECTING AMBIENT AIR QUALITY DATA

MESOSCALE ANALYSIS OF AMBIENT AIR QUALITY DATA

The mesoscale analysis of ambient air quality is important in assessing the impact of the highway on the environment. There are three primary purposes for this analysis: (1) to estimate the amount of pollutants transported into the project area from other areas, (2) to estimate the effects that emission control devices have on air quality and (3) to estimate future trends in air quality.

Transported Air Pollution

Air pollutants can be transported many miles. On-site pollutants may be generated many miles distant. Under certain meteorological conditions these pollutants may be transported to a downwind location. This can degrade ambient air quality for the downwind area especially when added to the area's own sources of pollution. Typical examples of areas where transported air pollutants occur in California are:

- 1) From the Los Angeles Basin into the Riverside and upland desert areas.
- 2) From the San Francisco Bay Area into San Jose.
- 3) From the San Francisco Bay Area into the Central Valley of California.

In all cases the transport of air pollutants is primarily caused by surface winds. The first step in a mesoscale study is to analyze the surface wind streamlines. An analysis developed by Crawford[6] involves a tracer pollutant (usually CO) and meteorological records for the proposed highway route area and the upwind pollutant source area. The procedure is as follows:

- 1) Select typical days where historical data show adverse air pollution conditions for the downwind location.
- 2) Compare the wind data for both the upwind and downwind stations for these days to make sure that surface winds could have transported the pollutants from the upwind source to the downwind receptor area.
- 3) For these typical days plot the data for concentrations at the downwind location vs. time of day.
- 4) Estimate the transport of pollutants from the dual peaks (if they exist) from the curve plotted in Step 3.

Figure 3 illustrates this concept. The travel time, as indicated on Figure 3, should be correlated with the wind speed and direction and distance of the upwind source from the downwind area. The

travel time is the time it takes the surface winds to transport the pollutants from the upwind source to the downwind area. The percentage of transported pollutants into an area can be estimated by the following equation:

$$\% \text{ transported} = \frac{H - L}{L} \times 100\% \text{ (expressed as a \% of the low peak concentration)} \quad (2)$$

Where H = pollutant concentration at higher peak

L = pollutant concentration at lower peak

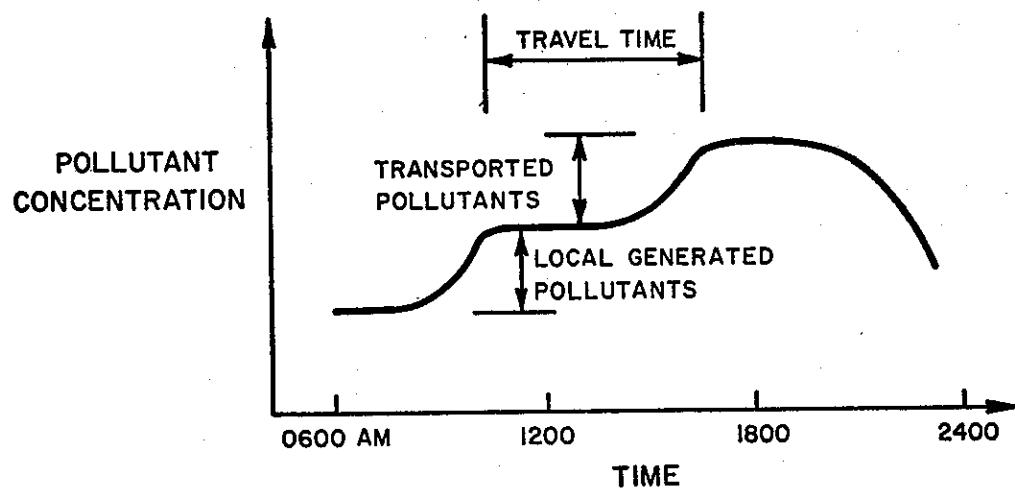


Fig. 3 ESTIMATES OF TRANSPORTED POLLUTANTS
FROM OTHER AREAS BY DUAL PEAK ANALYSIS

Another possible approach to estimate the amount of pollutants that are transported into the highway project area from an upwind source area is to give special consideration to wind speeds. The procedure is as follows:

1. Select typical days both within the highway project area and the upwind source area where historical meteorological conditions indicate light winds (less than 4 mph).
2. For these typical days (light winds), within the project area, plot pollutant concentration vs. time of day. This can indicate the pollutants generated within the project area.
3. Select typical days when the meteorological conditions indicate moderate to strong surface winds blowing from the upwind source area to the highway project area. Moderate surface winds can be considered as winds 8 to 12 mph while strong surface winds are greater than 13 mph.
4. For these typical days (moderate to strong winds), plot pollutant concentration vs. time of day.
5. Estimate the transport of pollutants by differences in concentrations (if they exist).

Figure 4 illustrates this concept.

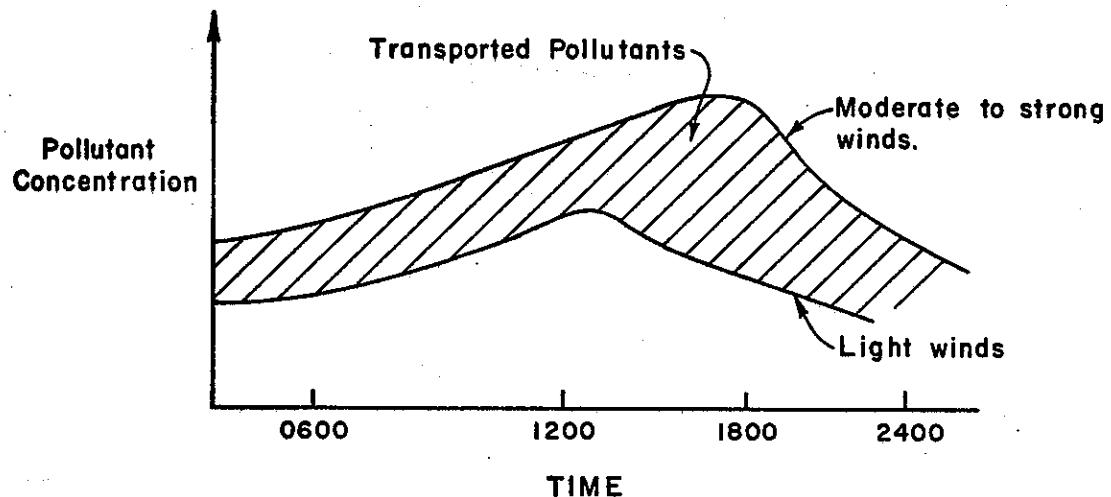
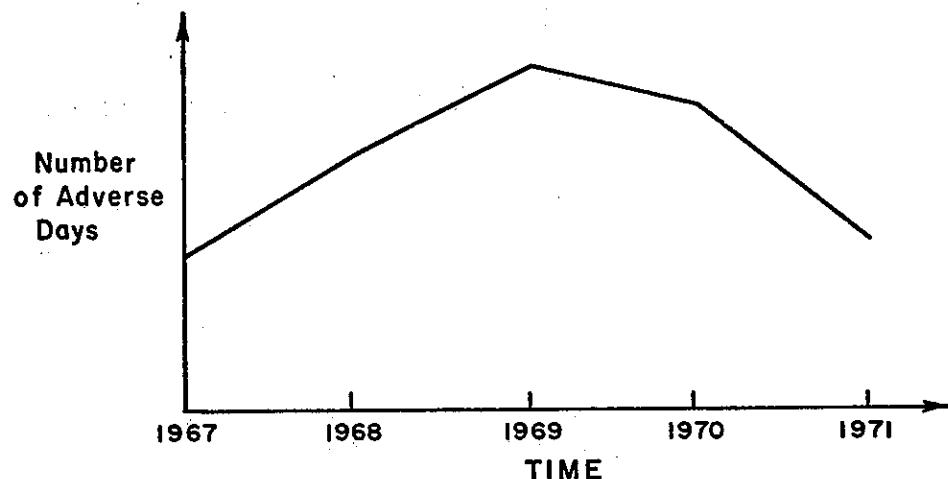


Fig. 4 ESTIMATES OF TRANSPORTED POLLUTANTS FROM OTHER AREAS BY SURFACE WIND ANALYSIS

Time History of Number of Adverse Days

An adverse day is said to exist when the pollutant concentration on a given day exceeds an arbitrary upper limit. A tabulation of the number of adverse days per year can be made for all the years from which historical data are available. Figure 5 illustrates this analysis for a hypothetical situation.



**Fig. 5 NUMBER OF ADVERSE DAYS
AT AIR MONITORING STATION**

Figure 5 shows a gradual increase in the number of adverse days up to 1969. From 1969 to 1971 there are significantly fewer adverse days. This can be attributed to such things as: (1) changes in meteorological conditions (better ventilation), (2) the increasing number of vehicles that have emission control devices, and (3) the combined effects of both. To distinguish between the effect of meteorological conditions and emission devices on vehicles, the meteorological records should be studied. This study should include: wind rose analysis of surface winds to compare wind speeds and directions, and comparison of elevated inversions aloft (if these data are available). If there were no significant changes in meteorology from 1967 to 1971, as in this example, the reduction in the number of adverse days can possibly be attributed to the increased number of vehicles with emission control devices (assuming the emissions of pollutants from industrial sources are controlled). If there were changes in meteorological conditions, the reduction would be due both to these changes and to emission control devices on vehicles.

Pollutant Burden Concept

A method of estimating pollutant burden within an area was discussed in an earlier report [2]. Figure 6 shows typical curves of pollutant burden vs. time as described in that report. The total pollutant burden is that attributed both to the freeway and the local traffic network. The curves in Figure 6 are the product of the daily vehicle miles traveled both on the freeway and on the local traffic network and the corresponding emission factors. These curves can be constructed for CO and HC.

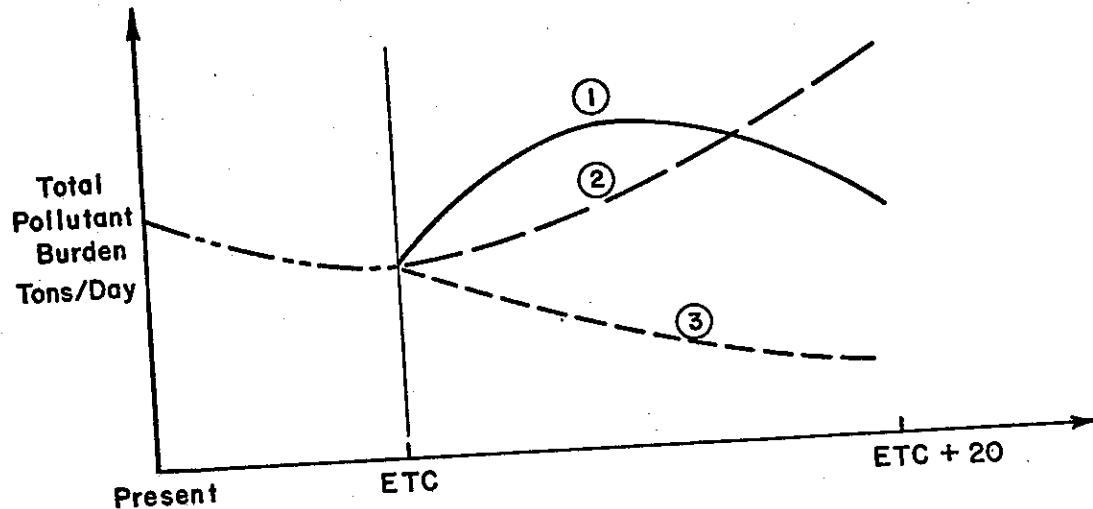


Fig. 6 TOTAL POLLUTANT BURDEN VS TIME

Curve 1 indicates that the critical year for pollutant burden occurs between the estimated time of completion and twenty years hence. Curve 2 indicates a situation where the rate of traffic increase overpowers the effect of emission control devices on motor vehicles. Curve 3 indicates an opposite situation where the rate of traffic increase is offset by the effectiveness of emission controls on vehicles.

The three curves in Figure 6 may aid in estimating future air pollution potential. For example: Suppose that Figure 5 represents an actual number of adverse days per year from air monitoring station records. Assume that curve 3 in Figure 6 represents the projected pollutant burden of HC within the area where the air monitoring station is located.* Since Curve 3 in Figure 6 indicates a reduction in the total burden of HC and Figure 5 indicates that the number of adverse days are reducing, a conclusion can be made that in general, the number of adverse days within the area are expected to be less in the future years. The total burden of HC includes sources other than automobiles and this fact should be reflected in the analysis.

*In the analysis HC is used as a measure of the possible photochemical reaction to produce O_3 .

PREDICTION OF FUTURE POLLUTANT CONCENTRATIONS

This analysis for predicting future pollutant concentrations is limited to CO because it is a relatively inert pollutant and is generated primarily by motor vehicles. The analysis further assumes that traffic originating from future changes in land use is considered in the traffic estimates and is based on a master plan of development for the impact area. It is important to emphasize that highways can have a very significant influence on land use patterns. It should be determined whether the master plan actually includes the highway or freeway in question. New industrial point sources will not normally make significant contributions to CO concentration as compared to highways. However, land use plans should be examined for future point source locations and their effect on future ambient air quality estimated.

When evaluating the impact of a highway on the air environment, it is necessary to know the existing ambient air quality within the proposed highway corridor and impact area. For a complete analysis, an air quality comparison must be made with and without the new highway for a period encompassing the estimated time of completion (ETC) and twenty years afterward (ETC+20). It is necessary to make this estimate of ambient air quality for ETC and ETC+20 using only existing and historical data. Knowing the historical ambient air quality associated with given meteorological conditions, estimates or predictions of future pollutant concentrations within the highway impact area can be made.

Beaton, et al [2] discussed an analysis for the critical year of the total CO burden. Those basic techniques can also be applied to future estimates of pollutant concentrations of CO within the highway corridor and impact area. Figure 6 summarizes three possibilities of the critical year concept.

The estimates of future CO concentrations can be made with the following assumptions:

1. Ambient air quality, as represented by CO, is influenced by the proposed highway and the associated changes in traffic on the surface network.
2. Future predictions of ambient CO concentration can be based on analysis of the present and historical air quality for different seasonal meteorological regimes and time periods as previously discussed in this manual.
3. The change (increase or decrease) in future ambient CO concentration can be predicted from an analysis similar to that shown in Figure 6.

Figure 7 illustrates a future change in CO levels (assuming a curve of Type 3 in Figure 6). Figure 7 is for a particular meteorological regime; for example, winter months, a.m. peak traffic period. Similar curves can be made for other seasons and time periods as discussed in reference [7].

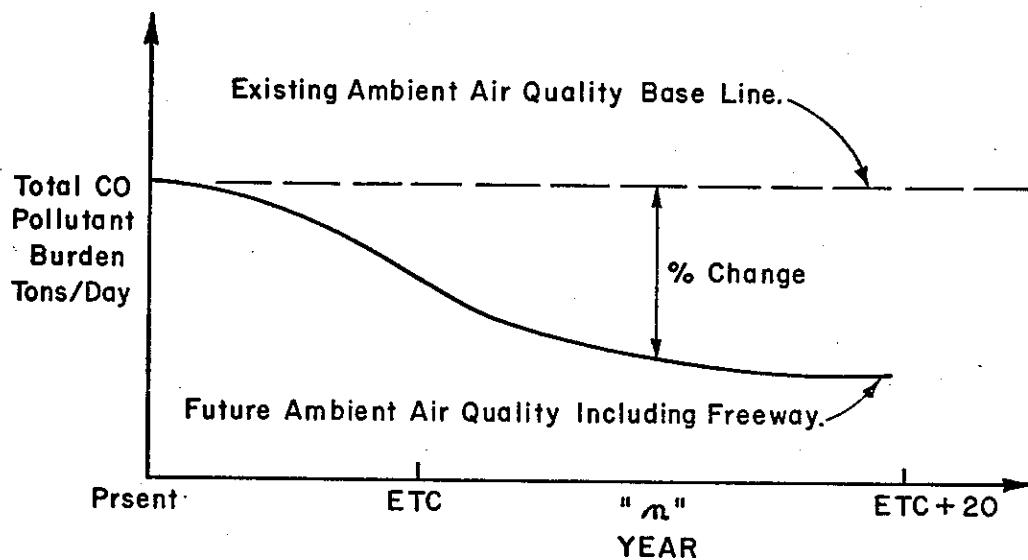


Fig. 7 FUTURE CHANGE IN CO BURDEN
UNDER A PARTICULAR METEOROLOGICAL REGIME

In Figure 7 the percent change is defined as follows:

$$\% \text{ Change} = \frac{(\text{TPB})_n - (\text{TPB})_p}{(\text{TPB})_p} \times 100\% \quad (3)$$

where $(\text{TPB})_n$ = total pollutant burden in tons per day at future time "n".

$(\text{TPB})_p$ = total pollutant burden in tons per day at present time "p".

A negative percent change indicates that ambient air quality is improving while a positive change indicates a degradation in ambient air quality. The percent change can be determined on an incremental basis from the present to the end of the period.

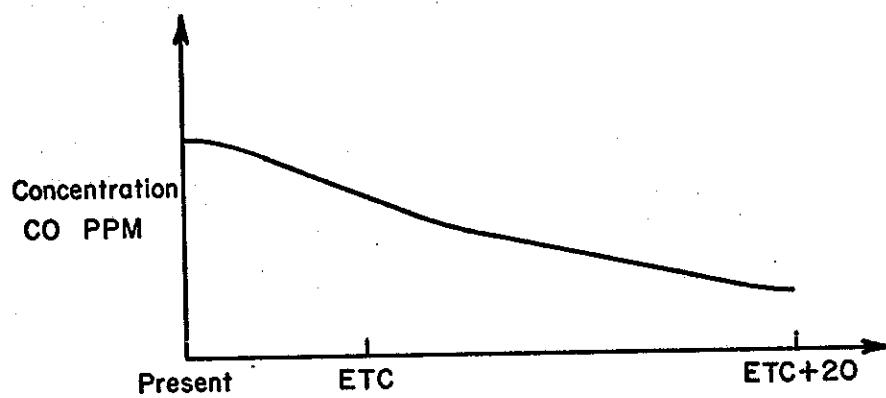
To make future estimates of CO for a given meteorological condition the procedures are as follows:

1. Determine the present air quality for CO from existing sources or field measurements. This analysis should be made for the most probable and worst meteorological conditions for each peak and off-peak traffic period.
2. Determine the percent change for future years in the total pollutant burden using equation 3.
3. Reduce or increase the present (as determined in Step 1) pollutant concentration to estimate the future ambient level. This reduction or increase is determined in Step 2.

Figure 8 illustrates the future estimates of average ambient CO concentration, based on the example shown in Figure 7.

Future ambient CO levels within the proposed highway corridor should be estimated with and without the new facility included in the analysis. In this way a comparison of the future ambient CO levels can be compared if the freeway is or is not built.

It may be possible to apply this same predictive analysis to hydrocarbons and oxides of nitrogen. However, since these two pollutants enter into photochemical reactions, the conditions for meteorological similarity should include radiation, temperature, and humidity in addition to wind speed and direction and inversion height. Also, since substantial amounts of these pollutants come from sources other than the internal combustion engine, the calculation of total pollutant burden becomes more complex.



**Fig. 8 FUTURE ESTIMATES OF CO
FOR A GIVEN METEOROLOGICAL CONDITION**

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APPENDIX A

AIR QUALITY DATA FOR CALIFORNIA

Appendix A presents typical pages from a copy of the report "California Air Quality Data for June, July and August 1971". This report was prepared by the California Air Resources Board and is typical of the quarterly reports for other years.

CALIFORNIA
AIR QUALITY DATA
JUNE, JULY, AUGUST 1971

The following tables provide detailed information on the quality of the ambient air over California cities. The information is provided largely by cooperating Air Pollution Control Districts and from air monitoring stations operated by the California Air Resources Board. The station locations, the contaminants measured, and the agencies collecting the data are listed on pages 48 through 52.

The air quality information supplied to the Air Resources Board by the cooperating agencies usually consists of hourly average concentrations (see below for definitions) and the daily peak concentrations. Some stations report only the maximum hourly average concentrations and the peak concentrations. Some measure only one contaminant, others as many as eight. Most stations are permanent installations, although circumstances or planning sometimes require relocation or discontinuance of a station.

The contaminants usually measured are oxidants, carbon monoxide, sulfur dioxide, nitric oxide, nitrogen dioxide, total oxides of nitrogen, total hydrocarbons, and suspended particulate. Sampling methods and reporting units are described below.

The information reported in the quarterly tables consists of the maximum hourly average concentration for each day, the highest of these values for the month, the monthly average of these values, and the peak concentration reached during the month. The peak concentration is usually higher than the highest hourly average reported; it can be the same, but not less. Tables presenting values for the daily average and highest reported reading for particulate matter by the AISI method and 24-hour values for particulate matter by the High Volume filter method are included. Also included are tables defining values equalling or exceeding the various ambient air quality standards for oxidant, carbon monoxide, and nitrogen dioxide. Selected summary tables are also given from time to time. These tables frequently cover more than one quarter and, on occasion, may cover periods later than this particular quarter.

In addition to the information reported here, detailed summaries including a variety of frequency distributions, tables of diurnal variation, daily averages, hourly averages, etc., for past years for the entire State are available for inspection (but not for distribution) in the Air Resources Board office in Sacramento and in the offices of the cooperating agencies. Copies are also sent to the National Aerometric Data Bank, EPA, Research Triangle Park, North Carolina 27711. The latest yearly summaries are for the 1971 calendar year.

DEFINITION OF TERMS, SAMPLING METHODS AND REPORTING UNITS

HOURLY AVERAGE: The average concentration for a 60-minute period, usually the clock hour. This is an integrated value, usually read from the strip chart by eye. Some parts of the hour have lower values than the average, some higher. There are twenty-four such values each day, starting with hour 00 and ending with hour 23.

DAILY PEAK CONCENTRATION: The highest concentration reached during 24 hours of sampling, and may be of only a few moments duration. The monthly peak concentration is the highest concentration reached during the month.

DAILY MAXIMUM HOURLY AVERAGE: This is the highest of the 24 hourly average values reported during the day. The monthly maximum hourly average is the highest such value reported during the month.

TOTAL OXIDANT: The term refers to all substances which may be present in the atmosphere that oxidize potassium iodide (KI) to form iodine (I_2) such as ozone, nitrogen dioxide (NO_2) and organic peroxides. Specific spectroscopic measurements indicate ozone is the principal oxidant in California air. Concentrations are measured with continuous recording analyzers using potassium iodide and are reported as parts of oxidant per million parts of air. The analyzers are standardized against ozone. All are colorimetric instruments, except those operated by the Bay Area Air Pollution Control District which are coulometric analyzers. Results are reported as ppm by volume.

NITROGEN OXIDES: Continuous measurement of NO_2 is performed by scrubbing the sample air with an absorbing solution (Saltzman type reagent) in an automatic recording analyzer. Reaction with the NO_2 forms a red azo dye which is measured photometrically and recorded on the strip chart as ppm NO_2 .

NO is determined by first passing the air sample through an acid permanganate bubbler (oxidizer) which converts the NO to NO_2 . The NO plus NO_2 originally present is recorded as NO_x value (parallel mode). In the series mode NO is measured by leading effluent gas from the NO_2 absorber containing only NO to the oxidizer followed by a second NO_2 absorber. The resulting color is recorded as ppm NO.

San Diego and Los Angeles measure nitrogen oxides by the series mode. All other districts and the state-operated stations use the parallel mode. Peak concentrations in all cases are read independently.

CARBON MONOXIDE: Carbon monoxide is measured continuously by measuring the absorption of nondispersed infrared radiation (NDIR) by the CO molecule. Irradiation from a hot filament is directed to a detector through two cells: A reference cell filled with dry air or nitrogen and a sample cell through which the air is continuously drawn. The difference in infrared absorption between the reference and sample cells creates a pressure difference in the detector. This pressure difference is transduced to CO concentrations in parts per million. The principal interferences in this method are caused by water vapor and carbon dioxide. Water vapor in the sampled air results in slightly higher values when compared with dry air.

SULFUR DIOXIDE: Sulfur dioxide concentrations are usually monitored by scrubbing sample air with a dilute solution of sulfuric acid and hydrogen peroxide. The SO_2 is converted to H_2SO_4 upon absorption in the solution, thus increasing the conductivity which is recorded as ppm SO_2 .

HYDROCARBONS: Hydrocarbons are measured with continuous flame ionization analyzers standardized against methane at all stations of the Los Angeles County Air Pollution Control District. All others are standardized against propane. Results are reported as parts of methane per million parts of air.

SUSPENDED PARTICULATE MATTER: Particulate matter samples are taken by automatic AISI samplers using two-hour sampling cycles at most stations, although one station uses a three-hour cycle, and one station uses a one-hour cycle. Values are calculated by comparing light units per 1,000 linear feet of air passing through the filter. COH units less the 1.0 indicate relatively clean air. Daily average values are tabulated regardless of the number of readings reported.

Suspended particulate matter samples are also taken by a High Volume sampler using a 24-hour sampling period. Values are calculated by weighing the filters before and after the sample is collected, the difference being expressed as micrograms of particulate matter per cubic meter of air drawn through the filter.

COMMENTS ON THE TABLES

Oxidant. One of the more smoggy days this quarter was June 15. On this high-oxidant and mostly cloudless day, the circulation over the Bay Area and southward was dominated by high pressure aloft. Maximum hourly oxidant concentrations above .08 ppm were reported by 40 stations in five air basins, viz. San Francisco Bay Area, San Joaquin, South Coast, San Diego, and Southeast Desert.

One of the least smoggy days this quarter was June 10. On this low-oxidant day the circulation over California was dominated by low pressure aloft.

The proximity of these two June days provides an opportunity to look at the maximum temperatures and mean wind speeds associated with a high-oxidant and a low-oxidant type day.

As shown in Table 1, maximum temperatures on the high-oxidant day were some 17°F higher than maximum temperatures on the low-oxidant day. This 17°F difference between the median values of the maximum temperature is seen in the data for each of three basins, although there is variability between individual stations. These, and other data, indicate that summertime high-oxidant values typically occur with above normal maximum temperatures.

The inclusion of mean daily wind speeds in Table 1 provides a look at another, somewhat more complex, meteorological variable. As shown, these wind speed data vary from basin to basin and from station to station. The San Francisco Airport mean speed of 12.5 mph appears relatively windy for a high-oxidant day. At Los Angeles Airport and Long Beach Airport the mean speeds are greater on the high-oxidant day. These and other data indicate that mean daily wind speeds from coastal stations may mask the fact that the morning winds are conducive for the accumulation of oxidant type pollutants, as was the case at San Francisco Airport on June 15.

Table 1

MAXIMUM DAILY TEMPERATURE AND MEAN DAILY WIND SPEED
FOR SELECTED CALIFORNIA STATIONS - JUNE 1971

<u>Station</u>	Maximum Temperature (°F)		Mean Wind Speed (mph)	
	<u>June 10*</u>	<u>June 15**</u>	<u>June 10*</u>	<u>June 15**</u>
San Francisco City	59	77	not available	
San Francisco Airport	67	83	13.5	12.5
<u>Oakland Airport</u>	<u>63</u>	<u>80</u>	<u>10.5</u>	<u>6.8</u>
Bay Area (median)	63	80°F	12.0	9.6 mph
Stockton Airport	82	100	9.9	7.9
Fresno Air Terminal	82	99	10.4	6.2
<u>Bakersfield Air Terminal</u>	<u>80</u>	<u>98</u>	<u>10.1</u>	<u>6.6</u>
San Joaquin Valley (median)	82	99°F	10.1	6.6 mph
Los Angeles City	66	93	not available	
Los Angeles Airport	67	70	6.2	6.9
<u>Long Beach Airport</u>	<u>70</u>	<u>84</u>	<u>7.3</u>	<u>8.3</u>
South Coast (median)	67	84°F	6.7	7.6 mph

* a low-oxidant day

** a high-oxidant day

Carbon Monoxide. The federal air quality standard of 9 ppm average concentration for 8 hours was exceeded at eight cities during the quarter. The maximum 8-hour average carbon monoxide concentration, 14 ppm, was recorded at Palm Springs on July 13. Palm Springs also recorded the greatest number of occurrences (9).

The federal standard of 35 ppm for one hour was not exceeded during this quarter.

Nitrogen Dioxide. The State air quality standard of .25 ppm for one hour was exceeded at ten stations, all in the South Coast Basin. The maximum hourly average concentration reported was .56 ppm at Los Angeles on June 15. The Burbank station reported 67 hours at or above .25 ppm during the quarter.

Suspended Particulate Matter. The maximum particulate concentration reported during the quarter was 453 $\mu\text{g}/\text{m}^3$ at Indio on June 10, a day with low oxidant levels statewide. For the State, 25% of the samples exceeded the State standard of 100 $\mu\text{g}/\text{m}^3$. A summary of high-volume sampling data by basin is given in Table 2.

Table 2

PARTICULATE LOADINGS (BY HIGH-VOLUME SAMPLER)
June, July, August 1971

Basin	No. of Samples	No. Exceeding			Max.	Min.
		260 $\mu\text{g}/\text{m}^3$	150 $\mu\text{g}/\text{m}^3$	100 $\mu\text{g}/\text{m}^3$		
North Coast	146	1	4	20	352 $\mu\text{g}/\text{m}^3$	9 $\mu\text{g}/\text{m}^3$
San Francisco Bay	385	0	1	19	165	10
North Central Coast	43	0	0	5	124	25
South Central Coast	36	0	3	4	232	16
South Coast	177	0	33	94	255	13
San Diego	28	0	1	8	159	38
Northeast Plateau	17	0	0	0	72	18
Sacramento Valley	64	0	1	9	155	30
San Joaquin Valley	166	5	42	101	425	37
Southeast Desert	43	3	10	17	453	8

The evaluation of high-volume sampling data is sometimes complicated by the fact that one sampler may "see" a specific local source emission while another nearby sampler may not. The degree of, or lack of, bias is more easily recognizable wherever two samplers are operated near to each other. However, such bias may exist and be hard to recognize wherever a single sampler is operated. Hence, care must be taken in locating a high-volume sampler to ensure that its exposure is representative. An example of this kind of bias can be seen in the two Ft. Bragg samples taken on July 10; the concentration found at one station was 59 $\mu\text{g}/\text{m}^3$ while the concentration found at the other station was 201 $\mu\text{g}/\text{m}^3$.

Lead. In July 1971 the Air Resources Board started to take atmospheric lead samples at five stations. As seen from the quarterly table, none of the stations exceeded the State standard during the quarter.

1971 Air Quality Summaries

Two summary tables of high-volume particulate sampling results for 1971 are given at the end of this issue. Several summary tables of 1971 oxidant experience are given just ahead of the particulate summary. The oxidant tables show the number of days, by station and by month, that the maximum hourly oxidant concentration exceeded .08 ppm. For stations submitting hourly average oxidant concentrations, the total number of hours in excess of .08 ppm is also given. The oxidant tables include only those stations reporting throughout 1971.

**DATA RECEIVED BY THE AIR RESOURCES BOARD
FROM AIR MONITORING STATIONS IN CALIFORNIA**

JUNE, JULY, AUGUST 1971

BASIN, COUNTY, AND CITY	PARTICIPATING AGENCY									
	CONTAMINANTS MEASURED									
	O _X	CO	NO	NO ₂	NO _x	HC	SO ₂	PARTICULATE MATTER AISI	H _i -VOL	
NORTH COAST AIR BASIN										
Humboldt County										
Arata										
Blue Lake										
Bureka - H. D. Hosp.										
Bureka - Gen. Hosp.										
Bureka - Hwy. Dept.										
Fortuna										
Garderville										
Oroick										
McKinleyville										
Sanoca										
Mendocino County										
Fort Bragg - So. So.										
Fort Bragg - City Hall										
Fort Bragg - Public Works										
Ukiah - Public Works										
Willits										
Capealla										
Ukiah - Mendo Mill										
SAN FRANCISCO BAY AREA AIR BASIN										
Alameda County										
Oakland										
San Leandro										
Fremont										
Livermore - Rincon										
Livermore - Railroad										
Contra Costa County										
Pleasant Hill										
Richmond										
Pittsburg										
North Richmond										
Point Richmond										
Marin County										
San Rafael										
San Francisco County										
San Francisco										
San Mateo County										
Redwood City										
Burlingame										
Santa Clara County										
San Jose										
Bonanza County										
Petaluma										

**DATA RECEIVED BY THE AIR RESOURCES BOARD
FROM AIR MONITORING STATIONS IN CALIFORNIA**

JUNE, JULY, AUGUST 1971

PARTICIPATING AGENCY

BASIN, COUNTY, AND CITY	CONTAMINANTS MEASURED							PARTICULATE MATTER HI-VOL	PARTICULATE MATTER AISI	NOX	NO ₂	CO	O _X	PARTICIPATING AGENCY	
	HC	NO	NO ₂	NO _x	O _x										
SAN FRANCISCO BAY AREA AIR BASIN															California Air Resources Board
Solano County	X	X	X	X											California Air Resources Board
Vallejo															California Air Resources Board
Fairfield															California Air Resources Board
Napa County	X														Monterey-Santa Cruz County Unified Air Pollution Control District
Napa - First St. Napa - Solano Hwy.															Monterey-Santa Cruz County Unified Air Pollution Control District
NORTH CENTRAL COAST AIR BASIN															Monterey-Santa Cruz County Unified Air Pollution Control District
Monterey County	X	X	X	X											Monterey-Santa Cruz County Unified Air Pollution Control District
Gonzales															California Air Resources Board
Natividad															California Air Resources Board
Salinas - Alisal															California Air Resources Board
Monterey															California Air Resources Board
King City															California Air Resources Board
Santa Cruz County															California Air Resources Board
Santa Cruz															California Air Resources Board
SOUTH CENTRAL COAST AIR BASIN															California Air Resources Board
San Luis Obispo County	X	X	X	X											California Air Resources Board
San Luis Obispo															California Air Resources Board
Santa Barbara County	X	X	X	X											California Air Resources Board
Santa Maria															California Air Resources Board
SOUTH COAST AIR BASIN															Ventura County Air Pollution Control District
Santa Barbara County	X	X	X	X											Ventura County Air Pollution Control District
Santa Barbara															Ventura County Air Pollution Control District
Ventura County															Ventura County Air Pollution Control District
Los Angeles - Downtown															Los Angeles County Air Pollution Control District
Azusa															Los Angeles County Air Pollution Control District
Burbank															Los Angeles County Air Pollution Control District
West Los Angeles															Los Angeles County Air Pollution Control District
Long Beach															Los Angeles County Air Pollution Control District
Redondo															Los Angeles County Air Pollution Control District
Pomona															Los Angeles County Air Pollution Control District
Lemonox															Los Angeles County Air Pollution Control District
Pasadena															Los Angeles County Air Pollution Control District
Whittier															Los Angeles County Air Pollution Control District
Neenah															Los Angeles County Air Pollution Control District

**DATA RECEIVED BY THE AIR RESOURCES BOARD
FROM AIR MONITORING STATIONS IN CALIFORNIA**
JUNE, JULY, AUGUST 1971

BASIN, COUNTY, AND CITY	CONTAMINANTS MEASURED										PARTICIPATING AGENCY
	OX	CO	NO	NO ₂	NO _x	HC	SO ₂	AISI	PM H/VOL		
Orange County											
Anaheim	X	X	X	X	X	X	X	X	X		
La Habra	X	X	X	X	X	X	X	X	X		
Orange County Airport	X	X	X	X	X	X	X	X	X		
Green River Golf Course											
Las Alamitos											
Riverside County											
Riverside	X	X	X	X	X	X	X	X	X		
Corona	X	X	X	X	X	X	X	X	X		
San Bernardino County											
San Bernardino	X	X	X	X	X	X	X	X	X		
Ontario											
Redlands	X	X	X	X	X	X	X	X	X		
SAN DIEGO AIR BASIN											
San Diego County											
San Diego	X	X	X	X	X	X	X	X	X		
Chollas Heights											
El Cajon											
Restor											
Mission Valley											
Oceanside											
NORTHEAST PLATEAU AIR BASIN											
Siskiyou County											
Yreka											
SACRAMENTO VALLEY AIR BASIN											
Butte County											
Chico											
Placer County											
Tahoe											
Sacramento County											
Sacramento - 13 & J	X	X	X	X	X	X	X	X	X		
Sacramento - Stockton Blvd.	X	X	X	X	X	X	X	X	X		
Sacramento - Greenridge School	X	X	X	X	X	X	X	X	X		
Sacramento - 1000 "P" Street											
Sacramento - 1025 "P" Street											
Shasta County											
Redding H. D.	X	X	X	X	X	X	X	X	X		
Shasta County Air Pollution Control Board											

**DATA RECEIVED BY THE AIR RESOURCES BOARD
FROM AIR MONITORING STATIONS IN CALIFORNIA**

JUNE, JULY, AUGUST 1971

BASIN, COUNTY, AND CITY	CONTAMINANTS MEASURED							PARTICIPATING AGENCY
	OX	CO	NO	NO ₂	NO _x	HC	SO ₂	
SACRAMENTO VALLEY AIR BASIN								
Butter County								
Yuba City	X	X	X	X	X	X	X	California Air Resources Board
SAN JOAQUIN VALLEY AIR BASIN								
San Joaquin County								
Stockton - Hazelton	X	X	X	X	X	X	X	Joint California Air Resources Board and San Joaquin County Air Pollution Control District
Tracy								
Lodi								San Joaquin County Air Pollution Control District
Fresno County								
Fresno - Cedar Street	X	X	X	X	X	X	X	California Air Resources Board
Fresno - Courthouse								
Kings County								
Hanford								
Avenal								
Kern County								
Bakersfield - Golden State	X	X	X	X	X	X	X	Kings County Air Pollution Control District
Bakersfield - Chester Ave.								
Bakersfield - Flower Street								
Penn Refuge								
Tulare								
Merced County								
Merced								
Stanislaus County								
Modesto	X	X	X	X	X	X	X	California Air Resources Board
Tulare County								
Visalia	X	X	X	X	X	X	X	California Air Resources Board
SOUTHEAST DESERT AIR BASIN								
Los Angeles County								
Lancaster	X	X	X	X	X	X	X	Los Angeles County Air Pollution Control District
Riverside County								
Banning								
Indio								
Palm Springs								
Thermal								

**DATA RECEIVED BY THE AIR RESOURCES BOARD
FROM AIR MONITORING STATIONS IN CALIFORNIA**

DATE: JULY, AUGUST 1971

**MAXIMUM HOURLY AVERAGE CONCENTRATION BY DAY AND MONTH FOR SPECIFIED CONTAMINANTS
CALIFORNIA AIR MONITORING STATION
JUNE, JULY AND AUGUST 1971**

**MAXIMUM HOURLY AVERAGE CONCENTRATION BY DAY AND MONTH FOR SPECIFIED CONTAMINANTS
CALIFORNIA AIR MONITORING STATIONS
JUNE, JULY AND AUGUST 1971**

MAXIMUM HOURLY AVERAGE CONCENTRATION BY DAY AND MONTH FOR SPECIFIED CONTAMINANTS

**MAXIMUM HOURLY AVERAGE CONCENTRATION BY DAY AND MONTH FOR SPECIFIED CONTAMINANTS
CALIFORNIA AIR MONITORING STATIONS
JUNE, JULY AND AUGUST 1971.**

MARXIMUM HOURLY AVERAGE CONCENTRATION BY DAY AND MONTH FOR SPECIFIED CONTAMINANTS
CALIFORNIA AIR MONITORING STATIONS
JUNE - JULY AND AUGUST 1971

MAXIMUM HOURLY AVERAGE CONCENTRATION BY DAY AND MONTH FOR SPECIFIED CONTAMINANTS
CALIFORNIA AIR MONITORING STATIONS
JUNE, JULY AND AUGUST 1971

PLACE AND CONTAMINANT	PARTS PER MILLION																															
	DAY OF MONTH																															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
J U N E																																
SAN JOAQUIN VALLEY BASIN																																
STOCKTON OXIDANT MONOXIDE	.6	.4	.7	.5	.4	.6	.7	.3	1	6	0	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
CARBON MONOXIDE	.6	.4	.7	.5	.4	.6	.7	.3	1	6	0	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
MODESTO OXIDANT MONOXIDE	.07	.08	.06	.05	.07	.05	.04	.03	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01		
CARBON MONOXIDE	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02		
NITROGEN DIOXIDE	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02		
NITROGEN MONOXIDE	.06	.05	.04	.03	.03	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02		
NITROGEN OXIDES	.04	.04	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03		
HYDROCARBONS	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	
VISALIA OXIDANT MONOXIDE	.06	.05	.04	.03	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01	.02	.01		
HANDBERG MONOXIDE	.02	.02	.03	.04	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05		
NITRIC OXIDE	.00	.00	.00	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01		
OXIDES OF NITROGEN	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02		
HYDROCARBONS	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	
SE DESERT BASIN OXIDANT																																
BAINING OXIDANT MONOXIDE	.04	.03	.06	.09	.10	.08	.06	.05	.03	.04	.10	.16	.16	.14	.09	.15	.13	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	
NITROGEN DIOXIDE	.02	.02	.04	.06	.06	.04	.04	.04	.03	.04	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	
OXIDES OF NITROGEN																																
PALM SPRINGS OXIDANT MONOXIDE	.06	.09	.15	.16	.16	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	
CARBON MONOXIDE	.11	.12	.12	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	
NITROGEN DIOXIDE	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	
NITRIC OXIDE	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	
OXIDES OF NITROGEN	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	
INDIO OXIDANT	.10	.09	.12	.11	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	
NITROGEN OXIDE	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	
OXIDES OF NITROGEN	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	
VICTORVILLE OXIDANT	.04	.04	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	

**MAXIMUM HOURLY AVERAGE CONCENTRATION BY DAY AND MONTH FOR SPECIFIED CONTAMINANTS
CALIFORNIA AIR MONITORING STATIONS**

**MAXIMUM HOURLY AVERAGE CONCENTRATION IN DAY AND NIGHT FOR SPECIFIED CONTAMINANTS
CALIFORNIA AIR MONITORING STATIONS
JUNE, JULY AND AUGUST 1971**

MAXIMUM HOURLY AVERAGE CONCENTRATION BY DAY AND MONTH FOR SPECIFIED CONTAMINANTS CAL-JONIA AIR MONITORING STATIONS JUNE, JULY AND AUGUST 1971

**MAXIMUM HOURLY AVERAGE CONCENTRATION BY DAY AND MONTH FOR SPECIFIED CONTAMINANTS
CALIFORNIA AM MONITORING STATIONS
JUNE, JULY AND AUGUST 1971**

MAXIMUM HOURLY AVERAGE CONCENTRATION BY DAY AND MONTH FOR SPECIFIED CONTAMINANTS
CALIFORNIA AIR MONITORING STATIONS
JUNE, JULY AND AUGUST 1971

PARTS PER MILLION

PLACE AND CONTAMINANT	DAY OF MONTH																													MAX HOURLY CONCEN-	AVG MONTHLY CONCEN-	PEAK				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30						
SAN DIEGO BASIN																																				
OXIDANT	.04	.05	.06	.05	.03	.03	.03	.04	.05	.06	.06	.06	.05	.05	.04	.03	.03	.04	.04	.05	.04	.03	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02			
CARBON MONOXIDE	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	
NITROGEN DIOXIDE	.03	.04	.04	.04	.04	.04	.04	.04	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05			
NITRIC OXIDE	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05			
OXIDES OF NITROGEN	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05			
HYDROCARBONS	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
CHOLLAS HEIGHTS																																				
NESTOR	.07	.07	.08	.05	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06			
MISSION VALLEY																																				
OXIDANT	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09			
NITROGEN DIOXIDE	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09			
NITRIC OXIDE	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29	.29			
OXIDES OF NITROGEN	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18	.18			
OCEANSIDE																																				
OXIDANT	.04	.06	.05	.04	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06		
SACO VALLEY BASIN																																				
CHICO																																				
OXIDANT	.12	.11	.09	.09	.10	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11			
CARBON MONOXIDE	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05			
NITRIC OXIDE	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01			
OXIDES OF NITROGEN	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05			
HYDROCARBONS	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04			
SACO 13TH AND J ST																																				
OXIDANT	.09	.09	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08			
CARBON MONOXIDE	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02			
NITROGEN DIOXIDE	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02			
OXIDES OF NITROGEN	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02			
HYDROCARBONS	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04			
SACO 10TH AND P ST																																				
OXIDANT	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12			
CARBON MONOXIDE	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04			
NITROGEN DIOXIDE	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02			
OXIDES OF NITROGEN	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02			
HYDROCARBONS	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03			
REDDING																																				
OXIDANT	.07	.08	.08	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07		
CARBON MONOXIDE	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02		
NITROGEN DIOXIDE	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02			
OXIDES OF NITROGEN	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02			
HYDROCARBONS	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03			
SACO JOAQ VALLEY BASIN																																				
FRESH COURT ROOF	.08	.09	.09	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08		
CARBON MONOXIDE	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05		
NITROGEN DIOXIDE	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05		
OXIDES OF NITROGEN	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06		
HYDROCARBONS	.07	.07	.07	.07	.																															

MAXIMUM HOURLY AVERAGE CONCENTRATION BY DAY AND MONTH FOR SPECIFIED CONTAMINANTS
CALIFORNIA AIR MONITORING STATIONS
JULY AND AUGUST 1971

PARTS PER MILLION

PLACE AND CONTAMINANT	DAY OF MONTH																								MAX HOURLY AVER-	AVG OVER HOURLY AVER-	PEAK
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
JULY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAN JOAQ VALLEY BASIN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BALTIMORE FIELD	.13	.11	.14	.13	.12	.02	.16	.02	.15	.16	.20	.22	.17	.14	.14	.14	.14	.13	.14	.14	.14	.14	.14	.14	.13	.13	.15
NITROGEN DIOXIDE	.11	.08	.09	.09	.08	.02	.12	.02	.11	.11	.11	.12	.17	.14	.14	.14	.14	.13	.14	.14	.14	.14	.14	.14	.13	.13	.13
NITRIC OXIDE	.13	.04	.05	.05	.05	.02	.12	.02	.11	.10	.10	.10	.11	.13	.13	.13	.13	.12	.13	.13	.13	.13	.13	.13	.13	.13	.13
NITRODES OF NITROGEN	.23	.04	.12	.15	.15	.02	.15	.02	.15	.20	.18	.15	.07	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04
STOCKTON HAZELTON ST	.07	.07	.06	.06	.06	.04	.04	.04	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05
OXIDANT	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
CARBON MONOXIDE	.04	.03	.03	.03	.03	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
NITROGEN DIOXIDE	.02	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
NITRIC OXIDE	.02	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
NITRODES OF NITROGEN	.02	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
OXIDANTS	.02	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
HYDROCARBONS	.04	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
STOCKTON HOTEL	7	6	5	3	7	5	5	3	2	6	7	6	7	7	7	6	5	6	5	6	7	6	5	6	5	6	6
CARBON MONOXIDE	.02	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
MODesto	.16	.11	.15	.12	.12	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02
CARBON MONOXIDE	.02	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
NITROGEN DIOXIDE	.04	.04	.04	.04	.04	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
NITRIC OXIDE	.02	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
OXIDANTS	.02	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
HYDROCARBONS	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
VISALIA	.12	.11	.09	.10	.11	.10	.09	.08	.07	.09	.12	.13	.11	.16	.16	.15	.14	.12	.11	.16	.17	.16	.15	.14	.15	.14	.15
OXIDANT	.04	.04	.04	.04	.04	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
CARBON MONOXIDE	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
NITROGEN DIOXIDE	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
NITRIC OXIDE	.04	.04	.04	.04	.04	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
OXIDATES OF NITROGEN	.04	.04	.04	.04	.04	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
SE DESERT BASIN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BANNING	.12	.10	.06	.06	.06	.07	.13	.11	.16	.10	.05	.15	.10	.07	.09	.07	.11	.15	.07	.14	.10	.06	.10	.13	.16	.07	.10
OXIDANT	.06	.06	.05	.05	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04
SULFUR DIOXIDE	.04	.02	.02	.02	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
NITROGEN DIOXIDE	.10	.07	.06	.06	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05
OXIDES OF NITROGEN	.04	.04	.04	.04	.04	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
PALM SPRINGS	.21	.18	.14	.13	.10	.13	.16	.17	.12	.11	.16	.12	.10	.16	.13	.13	.12	.11	.12	.16	.17	.14	.16	.17	.16	.17	.16
OXIDANT	.10	.10	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15
CARBON MONOXIDE	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04
NITRODES OF NITROGEN	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04
INDIO	.24	.20	.22	.23	.16	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12
OXIDANT	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
NITROGEN DIOXIDE	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05
NITRIC OXIDE	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
OXIDES OF NITROGEN	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
VICTORVILLE	.12	.12	.10	.10	.06	.10	.06	.10	.06	.10	.06	.10	.06	.10	.06	.10	.06	.10	.06	.10	.06	.10	.06	.10	.06	.10	.06

MAXIMUM HOURLY AVERAGE CONCENTRATION BY DAY AND MONTH FOR SPECIFIED CONTAMINANTS
CALIFORNIA AIR MONITORING STATIONS
JUNE, JULY AND AUGUST 1971

**MAXIMUM HOURLY AVERAGE CONCENTRATION BY DAY AND MONTH FOR SPECIFIED CONTAMINANTS
CALIFORNIA AIR MONITORING STATIONS
JULY AND AUGUST 1971**

**MAXIMUM HOURLY AVERAGE CONCENTRATION BY DAY AND MONTH FOR SPECIFIED CONTAMINANTS
CALIFORNIA AIR MONITORING STATIONS**

MAXIMUM HOURLY AVERAGE CONCENTRATION BY DAY AND MONTH FOR SPECIFIED CONTAMINANTS
CALIFORNIA AIR MONITORING STATIONS
JUNE, JULY AND AUGUST 1971

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CALIFORNIA AIR MONITORING STATIONS
JUNE, JULY AND AUGUST 1971**

**MAXIMUM HOURLY AVERAGE CONCENTRATION BY DAY AND MONTH FOR SPECIFIED CONTAMINANTS
CALIFORNIA AIR MONITORING STATIONS
JUNE, JULY AND AUGUST 1971**

SOURCE: STATE OF CALIFORNIA, AIR RESOURCES BOARD, AIR MONITORING RECORDS

**PARTICULATE MATTER
DAILY MEAN CONC VALUES BY THE AISI METHOD
CALIFORNIA AIR MONITORING STATIONS**

PARTICULATE MATTER
DAILY MEAN CON VALUES BY THE AISI METHOD
CALIFORNIA AIR MONITORING STATIONS

JUNE, JULY AND AUGUST 1971

CITY BASIN	DAY OF MONTH	DAILY REPORTED AVERAGE CONCENTRATION		HIGHEST VALUE	LAST REPORTED DATE
		1	2		
SAN DIEGO BASIN SAN DIEGO EL CAJON	1	.1	.1	.1	1.4 1
SACO VALLEY BASIN CHICO STOCKTON BLVD REEDINGTON	2	.1	.1	.1	1.6 28
SAN JOAQUIN VALLEY BASIN GRENO VEDORS STATE BAKERSFIELD FLOWER ST BAKERSFIELD	3	.1	.1	.1	1.9 26
MEREDITH HAZELTON ST STOCKTON HAZELTON ST TRACY	4	.1	.1	.1	1.6 26
MOJAVE VISALIA	5	.1	.1	.1	1.9 26
SE DESERT BASIN BAKERSFIELD SPRINGS THEIRNALL BURTON VICTORVILLE	6	.1	.1	.1	1.9 26
AUGUST	7	.1	.1	.1	1.9 26
SF BAY AREA BASIN RICHMOND PITTSBURGH MORNING REDWOOD CITY SAN JOSE ALMA ST. FAIRFIELD PELHAM OAKLAND LIVERMORE RAILROAD FREMONT CHASE WALS SAN FRANCISCO ELLIS	8	.1	.1	.1	1.9 26
NORTH CENTRAL BASIN SALINAS HATFIELD RD GONZALEZ SANTA CRUZ	9	.1	.1	.1	1.9 26
SOUTH CENTRAL BASIN SAN LUIS OBISPO	10	.1	.1	.1	1.9 26
SOUTH COAST BASIN ANNEHEIM LA HABRA RIVERSIDE SAN BERNARDINO	11	.1	.1	.1	1.9 26
SACO VALLEY BASIN CHICO STOCKTON BLVD REDDING FUBA CITY	12	.1	.1	.1	1.9 26
SAN JOAQUIN VALLEY BASIN FIRENO CORN ST BIRFOOD GOLDEN ST BIRFOOD GOLDEN ST HEDREN FIELD STOCKTON HAZELTON ST TRACY LODI MOKESTO VISALIA	13	.1	.1	.1	1.9 26
SE DESERT BASIN BANNING BROWNS VICTORVILLE	14	.1	.1	.1	1.9 26
	15	.1	.1	.1	1.9 26
	16	.1	.1	.1	1.9 26
	17	.1	.1	.1	1.9 26
	18	.1	.1	.1	1.9 26
	19	.1	.1	.1	1.9 26
	20	.1	.1	.1	1.9 26
	21	.1	.1	.1	1.9 26
	22	.1	.1	.1	1.9 26
	23	.1	.1	.1	1.9 26
	24	.1	.1	.1	1.9 26
	25	.1	.1	.1	1.9 26
	26	.1	.1	.1	1.9 26
	27	.1	.1	.1	1.9 26
	28	.1	.1	.1	1.9 26
	29	.1	.1	.1	1.9 26
	30	.1	.1	.1	1.9 26
	31	.1	.1	.1	1.9 26

^a INDICATES THE FIRST DAY OF TWO OR MORE DAYS WITHIN THE MONTH HAVING THE SAME PEAK CONCENTRATION

SOURCE: STATE OF CALIFORNIA, AIR RESOURCES BOARD, AIR MONITORING RECORDS

PARTICULATE MATTER PER CUBIC METRE BY THE HIGH VOLUME AIR SAMPLING METHOD
JUNE, JULY, AUGUST 1971

MONTH, BASIN, STATION	DAYS OF THE MONTH																													NO. Σ $100 \mu g/m^3$		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
JUNE, 1971				*	*					*	*				*	*		*	*					*	*							
NORTH COAST AIR BASIN																																
Arcata																																
Blue Lake																																
Eureka Health Dept.																																
Eureka Gen. Hosp.																																
Fortuna Hwy Dept.																																
Fortuna																																
Garberville																																
Orrick																																
McKinleyville																																
Samsa																																
Port Bragg South																																
Port Bragg City Hall																																
Ukiah Mendo Mill																																
Willits																																
Gualpella																																
SAN FRANCISCO BAY AREA AIR BASIN																																
Richmond																																
Pittsburg																																
San Rafael																																
Bedford City																																
Burlingame																																
San Jose																																
Vallejo																																
Petaluma																																
Fremont																																
Livermore																																
San Francisco																																
NORTH CENTRAL COAST AIR BASIN																																
King City																																
Salinas																																
Gonzales																																
Monterey																																
Santa Cruz																																
SOUTH CENTRAL COAST AIR BASIN																																
San Luis Obispo																																
Santa Maria																																
SOUTH COAST AIR BASIN																																
Anaheim																																
La Habra																																
Riverside																																
Santa Barbara																																
Ojai																																
Oceanside																																
Camarillo																																

* Indicates Weekends and Holidays

PARTICULATE MATTER
MICROGRAMS PER CUBIC METER BY THE HIGH VOLUME AIR SAMPLING METHOD
JUNE, JULY, AUGUST 1971

MONTH, BASIN, STATION	DAYS OF THE MONTH																												NO. \geq 100 $\mu\text{g}/\text{m}^3$		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
JUNE, 1971																															
SAN DIEGO AIR BASIN																															
San Diego																															
El Cajon																															
NORTHEAST PLATEAU AIR BASIN																															
Yreka																															
SACRAMENTO VALLEY AIR BASIN																															
Chico																															
Sacramento 10th & P																															
Redding Market St.																															
Redding Hospital Ln.																															
Tahoe																															
SAN JOAQUIN VALLEY AIR BASIN																															
Fresno																															
Bakersfield Gld. State Hwy																															
Bakersfield Flower St.																															
Bakersfield Chester Ave.																															
Kern Refuge																															
Taft																															
Stockton																															
Modesto																															
Hanford																															
Mendota																															
Visalia																															
SOUTHEAST DESERT AIR BASIN																															
Banning																															
Palm Springs																															
Indio																															
Julio 1971																															
NORTH COAST AIR BASIN																															
Arcata																															
Blue Lake																															
Eureka Health Dept.																															
Eureka Gen. Hosp.																															
Eureka Hwy Dept.																															
Fortuna																															
McKinleyville																															
Somes																															
Fort Bragg South																															
Fort Bragg City Hall																															
Ukiah Hendo Mill																															
Ukiah Public Works																															
Willits																															
Gualala																															

* Indicates Weekends and Holidays

PARTICULATE MATTER
MICROGRAMS PER CUBIC METER IN THE HIGH VOLUME AIR SAMPLING METHOD
JUNE, JULY, AUGUST 1971

MONTH, BASIN, STATION	DAYS OF THE MONTH																													NO. \geq 100 $\mu\text{g}/\text{m}^3$			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
JULY, 1971	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
SAN FRANCISCO BAY AREA AIR BASIN																																	
Richmond	97	96	41	58	78	56	58	24	30	23	26	56	44	61	43	31	42	46	59	51	48	47	47	46	47	48	47	48	47	48	64		
Pittsburg	58	53	59	63	63	52	52	30	23	56	54	56	54	43	44	43	41	59	59	59	52	52	53	53	53	53	53	53	53	53	53		
San Rafael	70	63	63	63	63	70	74	74	74	70	62	62	62	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94		
Redwood City	87	98	98	98	98	79	79	79	79	79	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76		
Burlingame	114																																
San Jose																																	
Vallejo																																	
Petaluma																																	
Fremont																																	
Livermore																																	
San Francisco																																	
NORTH CENTRAL COAST AIR BASIN																																	
King City																																	
Salinas																																	
Gonzales																																	
Monterey																																	
Santa Cruz																																	
SOUTH CENTRAL COAST AIR BASIN																																	
San Luis Obispo																																	
Santa Maria																																	
SOUTH COAST AIR BASIN																																	
Anaheim																																	
Irvine																																	
San Bernardino																																	
Ventura																																	
Ojai																																	
Oxnard																																	
Camarillo																																	
Los Angeles Downtown																																	
Atusa																																	
Lennox																																	
Pasadena																																	
SAN DIEGO AIR BASIN																																	
San Diego																																	
El Cajon																																	
NORTHEAST PLATEAU AIR BASIN																																	
Yreka																																	

* Indicates Weekends and Holidays

PARTICULATE MATTER .CUBIC METER BY THE HIGH VOLUME AIR SAMPLING METHOD
MICROGRAMS PER CUBIC METER

JUNE, JULY, AUGUST 1971

MONTH, BASIN, STATION	DAYS OF THE MONTH																												NO. ≥ 100 μg/m ³		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
JULY, 1971	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
SACRAMENTO VALLEY AIR BASIN																															
Chico	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	
Sacramento 10th & P	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	
Redding Market St.	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	
Redding Hospital Ln.	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	
Tuba City	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	
SAN JOAQUIN VALLEY AIR BASIN																															
Fresno	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
Bakersfield Gld State Hwy.	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109		
Bakersfield Flower St.	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127		
Bakersfield Chester Ave.	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
Kern Refuge	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	
Taft	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	
Stockton	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204		
Modesto	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	
Visalia	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
SOUTHEAST DESERT AIR BASIN																															
Ridgecrest	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	
Palm Springs	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	
Thermal	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
Indio	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162		
AUGUST, 1971	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
NORTH COAST AIR BASIN																															
Arcata	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
Blue Lake	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
Eureka Health Dept.	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	
Eureka Gen. Hosp.	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	
Eureka Hwy Dept.	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	
Fortuna	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	
McKinleyville	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
Somes	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	
Fort Bragg South	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	
Ukiah Mendo Mill	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	
Ukiah Public Works	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119		
Calpella																															

* Indicates Weekends and Holidays

PARTICULATE MATTER METER BY THE HIGH VOLUME AIR SAMPLING METHOD
JUNE, JULY, AUGUST, 1971

MONTH, BASIN, STATION	MICROGRAMS PER CUBIC METER																															
	DAYS OF THE MONTH																															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	NO. \geq 100 $\mu\text{g/m}^3$
AUGUST, 1971	*																															
SAN FRANCISCO BAY AREA AIR BASIN																																
Richmond	51	52	56	50	44	26	50	49	33	20	72	61	77	64	52	35	38	30	32	39	32	35	36	25	27	25	28	33	31	28	31	
Pittsburg	36	30	37	28	33	20	52	49	33	20	104	104	85	85	75	41	47	55	52	53	50	52	50	42	46	42	50	52	51	52	51	
San Rafael																																
Redwood City																																
Burlingame																																
San Jose																																
Vallejo																																
Petaluma																																
Fremont																																
Livermore																																
San Francisco																																
NORTH CENTRAL COAST AIR BASIN																																
King City																																
Salinas																																
Gonzales																																
Monterey																																
Santa Cruz																																
SOUTH CENTRAL COAST AIR BASIN																																
San Luis Obispo																																
Santa Maria																																
SOUTH COAST AIR BASIN																																
Anaheim	45	87																														
Los Alamitos	54	89																														
La Habra			78	121	95																											
Santa Ana Airport			79																													
Riverside																																
San Bernardino																																
Santa Barbara																																
Ventura																																
Ojai																																
Oxnard																																
Camarillo																																
Los Angeles Downtown																																
Atmos																																
Lennox																																
Pasadena																																
SAN DIEGO AIR BASIN																																
San Diego																																
El Cajon																																

* Indicates Weekends and Holidays

PARTICULATE MATTER
MICROGRAMS PER CUBIC METER BY THE HIGH VOLUME AIR SAMPLING METHOD
JUNE, JULY AUGUST 1971

MONTH, BASIN, STATION	DAYS OF THE MONTH																													NO. = $100^3/\text{m}^3$	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
AUGUST, 1971	*							*				*	*				*	*			*	*									
NORTHEAST PLATEAU AIR BASIN																															
Yreka																															
SACRAMENTO VALLEY AIR BASIN																															
Chico																															
Sacramento 10th and P																															
Redding Market St.																															
Redding Hospital Ln.																															
Tuba City																															
SAN JACQUIN VALLEY AIR BASIN																															
Fresno																															
Bakersfield Gld. State Hwy.																															
Bakersfield Flower St.																															
Bakersfield Chester Ave.																															
Kern Refuge																															
Taft																															
Stockton																															
Hanford																															
Avenal																															
Madera																															
Visalia																															
SOUTHEAST DESERT AIR BASIN																															
Ridgecrest																															
Mojave																															
Indio																															

* Indicates Weekends and Holidays

LEAD
AS DETERMINED FROM HI VOL SAMPLES USING
THE DITHIZONE METHOD
(Micrograms per cubic meter)
JULY AND AUGUST 1971

MONTH	REDDING	SACRAMENTO	BAKERSFIELD	FRESNO	Location	
					SAN JUAN	OBIISPO
July						
5	0.10	0.30	0.70	0.40	0.20	
10	0.20	0.40	0.40	0.32	0.40	
13	--	--	--	0.80	--	
15	--	0.40	0.80	0.50	0.30	
20	0.30	0.50	0.70	0.60	0.30	
25	0.50	0.20	1.02	0.60	0.20	
30	<u>0.60</u>	<u>0.60</u>	<u>1.00</u>	<u>0.80</u>	<u>0.80</u>	
Average	0.34	0.40	0.77	0.57	0.37	
August						
4	0.50	0.40	1.02	--	0.70	
9	0.30	1.00	1.45	0.59	0.51	
14	0.45	0.48	0.86	0.82	0.45	
19	0.56	0.40	0.83	0.86	0.35	
24	0.49	0.92	1.01	1.36	0.27	
29	<u>0.38</u>	<u>0.24</u>	<u>1.00</u>	<u>0.50</u>	<u>0.30</u>	
Average	0.45	0.57	1.03	0.83	0.43	

**OXIDANT
MAXIMUM HOURLY AVERAGE CONCENTRATION IN PPM ON DAYS WHEN A
0.08 PPM VALUE WAS EQUALLED OR EXCEEDED, BY DAY AND STATION**

JUNE, JULY, AUGUST 1971

MONTH AND STATION	DAY OF MONTH																												TOTAL NO. EXCEEDED				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	HOURS	DAYS
SAN FRANCISCO BAY AREA AIR BASIN																																	
JUNE, 1971																																	
Pleasant Hill	.09																																
Richmond																																	
Pittsburgh																																	
San Anselmi																																	
Redwood City																																	
Fairfield																																	
Vallejo - Trafier																																	
San Leandro - Rincon																																	
Livermore - Rincon																																	
Fremont - Railroad																																	
Fremont																																	
NORTH CENTRAL COAST AIR BASIN																																	
Gonzales																																	
Santa Cruz																																	
SOUTH CENTRAL COAST AIR BASIN																																	
San Luis Obispo																																	
SOUTH COAST AIR BASIN																																	
Anaheim	.10	.08																															
Ia. Hatra																																	
Orange County Airport																																	
Green River Golf Course																																	
Riverside																																	
Corona																																	
San Bernardino																																	
Ontario																																	
Redlands																																	
Santa Barbara																																	
Ojai																																	
Camarillo																																	
Los Angeles																																	
Anza																																	
Burbank																																	
West Los Angeles																																	
Long Beach																																	
Reseda																																	
Pomona																																	
Lennox																																	
Pasadena																																	
Whittier																																	
Newhall																																	
SAN DIEGO AIR BASIN																																	
San Diego																																	
Chollas Heights																																	
El Cajon																																	
Nesbit																																	
Mission Valley																																	
Oceanridge																																	

**MAXIMUM HOURLY AVERAGE CONCENTRATION IN PPM ON DAYS WHEN A
0.08 PPM VALUE WAS EQUALLED OR EXCEEDED, BY DAY AND STATION**

JUNE, JULY, AUGUST 1971

MONTH AND STATION	DAY OF MONTH																													TOTAL NO. EXCEEDED			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
JUNE 1971	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
SACRAMENTO VALLEY AIR BASIN																																	
Chico	.08	.09	.09	.09	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	37		
Sacramento - 12th & J Sts.																																	8
Sacramento - Creekside																																	1
Sacramento - 10th & P Sts.																																	5
Redding																																	4
SAN JOAQUIN VALLEY AIR BASIN																																	8
Fresno																																	3
Bakersfield - Golden State																																	27
Bakersfield - Chester																																	21
Modesto																																	24
Visalia																																	8
SOUTHEAST DESERT AIR BASIN																																	
Banning																																	
Palm Springs																																	
Indio																																	
Victorville																																	
Lancaster																																	
JULY, 1971	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
SAN FRANCISCO BAY AREA AIR BASIN																																	
Pleasant Hill	.08	.09	.09	.08	.09	.09	.08	.09	.09	.11	.11	.12	.08	.09	.11	.13	.09	.09	.11	.09	.09	.11	.08	.08	.08	.08	.08	.08	.08	.08	.08	47	
Pittsburg	.08	.10	.08	.10	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	14	
San Rafael																																	
Napa																																	
Redwood City																																	
San Jose																																	
Fairfield																																	
Vallejo - Tiveller																																	
San Leandro - Railroad																																	
Livermore - Railroad																																	
NORTH CENTRAL COAST AIR BASIN																																	
Gonzales																																	
SOUTH CENTRAL COAST AIR BASIN																																	
San Luis Obispo																																	
Santa Maria																																	
SOUTH COAST AIR BASIN																																	
Anaheim																																	
La Habra																																	
Orange County Airport																																	
Green River Golf Course																																	
Riverside																																	
Corona																																	
San Bernardino																																	

**OXIDANT
MAXIMUM HOURLY AVERAGE CONCENTRATION IN PPM ON DAYS WHEN A
0.08 PPM VALUE WAS EQUALLED OR EXCEEDED, BY DAY AND STATION**

JUNE, JULY, AUGUST 1971

MONTH AND STATION	DAY OF MONTH																									TOTAL NO. EXCEEDED										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
JUNX, 1971	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*				
SOUTH COAST AIR BASIN																																				
Ontario	.12	.15	.13	.12	.13	.14	.21	.23	.25	.23	.25	.18	.11	.24	.16	.21	.16	.18	.18	.20	.20	.23	.15	.22	.15	.25	.13	.13	.15	.15	.12	.190				
Redlands	.10	.20	.18	.14	.16	.17	.21	.25	.31	.21	.17	.26	.21	.21	.16	.18	.20	.20	.23	.20	.23	.16	.16	.20	.21	.15	.15	.15	.15	.10	.285					
Santa Barbara	.12	.18	.16	.15	.15	.16	.19	.20	.20	.18	.10	.10	.10	.11	.12	.10	.10	.10	.10	.10	.10	.09	.10	.10	.10	.10	.10	.10	.10	.10	.10	.88				
Ojai	.11	.12	.15	.15	.15	.16	.19	.19	.19	.12	.10	.10	.10	.11	.12	.10	.10	.10	.10	.10	.10	.09	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10			
Camarillo	.08	.10	.10	.10	.10	.11	.12	.12	.12	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.09	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10			
Los Angeles	.12	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14			
Anaheim	.12	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14			
Burbank	.16	.16	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15			
West Los Angeles	.12	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14	.14			
Long Beach	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16			
Rosedale	.13	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16			
Lomax	.15	.21	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09			
Pasadena	.08	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09			
Whittier	.08	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09			
Rowhall	.20	.22	.15	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16			
SAN DIEGO AIR BASIN																																				
San Diego	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08			
Chula Vista Heights	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09			
El Cajon	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08			
Nesbit	.09	.10	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09			
Mission Valley	.09	.10	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09			
Oceanside	.09	.10	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09			
SACRAMENTO VALLEY AIR BASIN																																				
Chico	.12	.11	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09		
Sacramento - 13th & J Sts.	.09	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08		
Sacramento - Creekside	.12	.10	.11	.11	.11	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	
Sacramento - 1000 P St.	.12	.13	.12	.14	.14	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	
Redding	.12	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	
Yuba City	.12	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	
SAN JOAQUIN VALLEY AIR BASIN																																				
Fresno	.08	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	.09	
Bakersfield - Golden State	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	
Bakersfield - Chester	.12	.13	.11	.14	.13	.12	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	
Stockton	.16	.11	.15	.13	.16	.14	.10	.11	.10	.09	.09	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	
Modesto	.12	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	
Visalia	.12	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10	
SOUTHEAST DESERT AIR BASIN																																				
Burning	.12	.10	.14	.13	.13	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	
Palm Springs	.21	.18	.14	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	
Indio	.21	.20	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	.19	
Victorville	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	.12	
Lancaster	.10	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	

**MAXIMUM HOURLY AVERAGE CONCENTRATION IN PPM ON DAYS WHEN A
0.08 PPM VALUE WAS EQUALLED OR EXCEEDED, BY DAY AND STATION**

JUNE, JULY, AUGUST 1971

MONTH AND STATION	DAY OF MONTH																													TOTAL NO. EXCEEDED	DAYS		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
AUGUST, 1971	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
SAN FRANCISCO BAY AREA AIR BASIN																																	
Pleasant Hill																																	
Richmond																																	
Pittsburg	.11	.08																															
Berwood City																																	
San Jose																																	
Fairfield																																	
Vallejo - Trailer																																	
Oakland																																	
Livermore - Railroad	.15	.09																															
Freemont																																	
SOUTH CENTRAL COAST AIR BASIN																																	
San Luis Obispo																																	
SOUTH COAST AIR BASIN																																	
Anaheim																																	
La Habra																																	
Orange County Airport																																	
Green River Golf Course																																	
Riverside																																	
Corona																																	
Ontario																																	
Redlands																																	
Santa Barbara																																	
Ojai																																	
Camarillo																																	
Los Angeles																																	
Azusa																																	
Burbank																																	
West Los Angeles																																	
Long Beach																																	
Reseda																																	
Pomona																																	
Lennox																																	
Pasadena																																	
Whittier																																	
Newhall																																	
SAN DIEGO AIR BASIN																																	
San Diego																																	
Gholles Heights																																	
El Cajon																																	
Miramar																																	
Mission Valley																																	
Oceanside																																	
SACRAMENTO VALLEY AIR BASIN																																	
Chico																																	
Sacramento - 13th & J Sta.	.13	.12	.09	.10	.08	.14	.08	.15	.12	.11	.09	.10	.11	.10	.15	.09	.09	.10	.11	.09	.09	.10	.08	.09	.08	.09	.08	.09	.08	.09	.08		
Sacramento - Creekside	.14	.09	.08	.08	.09	.08	.09	.08	.09	.08	.09	.08	.09	.08	.09	.08	.08	.09	.08	.09	.08	.09	.08	.09	.08	.09	.08	.09	.08	.09	.08		

**OXIDANT CONCENTRATION IN PPM ON DAYS WHEN A
MAXIMUM HOURLY AVERAGE CONCENTRATION EQUALLED OR EXCEEDED,
BY DAY AND STATION
0.08 PPM VALUE WAS EQUALLED OR EXCEEDED.**

JUNE, JULY, AUGUST 1971

MONTH AND STATION	DAY OF MONTH																													TOTAL NO. EXCEEDED						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
AUGUST, 1971	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*				
SACRAMENTO VALLEY AIR BASIN	.19	.11	.09	.12	.08	.11	.09	.12	.15	.13	.10	.12	.16	.08	.11	.13	.10	.09	.11	.15	.10	.09	.11	.16	.15	.13	.10	.08	.08	.08						
Sacramento - 1000 F St.	.10	.11	.11	.16	.08	.09	.10	.08	.11	.13	.11	.12	.12	.09	.12	.13	.12	.10	.09	.11	.15	.10	.08	.11	.16	.15	.13	.10	.08	.08	.08					
Redding																																				
Yuba City																																				
SAN JOAQUIN VALLEY AIR BASIN	.13	.16	.09	.08	.08	.12	.11	.12	.15	.12	.11	.12	.13	.09	.12	.11	.10	.08	.12	.15	.11	.09	.12	.16	.15	.13	.10	.09	.11	.10	.08	.08				
Paso Robles - Golden State	.11	.11	.12	.12	.11	.11	.12	.11	.16	.09	.11	.10	.13	.12	.10	.08	.10	.10	.10	.08	.12	.10	.10	.13	.14	.13	.12	.11	.10	.09	.08	.08				
Bakersfield - Chester	.15	.14	.09	.10	.10	.13	.08	.14	.12	.11	.12	.12	.12	.15	.12	.11	.11	.11	.08	.16	.15	.10	.13	.11	.10	.13	.12	.11	.10	.09	.08	.08				
Stockton	.14	.15	.11	.09	.13	.11	.11	.12	.11	.12	.12	.12	.12	.11	.11	.11	.11	.11	.08	.16	.15	.10	.13	.11	.10	.13	.12	.11	.10	.09	.08	.08				
Madera																																				
Visalia																																				
SOUTHEAST DESERT AIR BASIN	.09	.08	.13	.08	.11	.11	.08	.11	.12	.13	.12	.11	.11	.08	.11	.11	.10	.08	.10	.16	.09	.12	.10	.09	.11	.14	.13	.12	.10	.09	.11	.10	.09	.08	.08	
Banning	.14	.09	.09	.08	.10	.08	.12	.13	.12	.13	.12	.11	.11	.08	.10	.08	.08	.08	.08	.09	.12	.09	.11	.12	.13	.12	.11	.10	.09	.11	.10	.09	.08	.08		
Palm Springs	.08	.08	.12	.12	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	.13	
Indio																																				
Victorville																																				
Lancaster																																				

CARBON MONOXIDE
MAXIMUM 8 HOUR AVERAGE IN PPM, ON DAYS WHEN NON-OVERLAPPING 8 HOUR
AVERAGES EQUALLED OR EXCEEDED 9 PPM, BY DAY AND STATION

JUNE, JULY, AUGUST 1971

MONTH, BASIN, STATION	DAY OF MONTH																													TOTAL NUMBER EPISODES		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
JUNE 1971										*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
SOUTH COAST AIR BASIN																																
Riverside																																
Downtown Los Angeles																																
Reseda																																
SOUTHEAST DESERT AIR BASIN																																
Palm Springs																																
JULY 1971																																
SOUTH COAST AIR BASIN																																
Riverside																																
Downtown Los Angeles																																
Reseda																																
SOUTHEAST DESERT AIR BASIN																																
Palm Springs																																
AUGUST 1971																																
SOUTH COAST AIR BASIN																																
Riverside																																
Burbank																																
Long Beach																																
Reseda																																
Lemmon																																
SAN JOAQUIN VALLEY AIR BASIN																																
Via Maria																																

NITROGEN DIOXIDE
 MAXIMUM HOURLY AVERAGE CONCENTRATION IN PPM ON DAYS WHEN A
 0.25 PPM VALUE WAS EQUALLED OR EXCEEDED, BY DAY AND STATION
 JUNE, JULY, AUGUST 1971.

MONTH AND STATION	DAY OF MONTH																													TOTAL NO. EXCEEDED		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
<u>JUNE, 1971</u>																																
SOUTH COAST AIR BASIN																																
Los Angeles																																
Burbank																																
West Los Angeles																																
Lennox																																
Pasadena																																
Whittier																																
<u>JULY, 1971</u>																																
SOUTH COAST AIR BASIN																																
San Bernardino																																
Los Angeles																																
Burbank																																
West Los Angeles																																
Long Beach																																
Pomona																																
Lennox																																
Whittier																																
<u>AUGUST, 1971</u>																																
SOUTH COAST AIR BASIN																																
Los Angeles																																
Burbank																																
Long Beach																																
Redondo																																
Pasadena																																
Whittier																																

ANNUAL SUMMARY OF HI VOL DATA
RECEIVED BY THE AIR RESOURCES BOARD

FOR 1971

BASIN, STATION	NO. OF SAMPLES	NO. OF SAMPLES EXCEEDING			MAX μg/m ³	MIN μg/m ³	ANNUAL GEOMETRIC MEAN μg/m ³	69
		260 μg/m ³	150 μg/m ³	100 μg/m ³				
NORTH COAST AIR BASIN								
Arcata	51	-	1	1	3	13	49	1.61
Blue Lake	12	1	2	8	281	41	78	2.03
Calpella	56	2	-	1	359	14	-	-
Eureka - Gen. Hosp.	12	-	1	1	174	18	45	1.69
Eureka - Health Dept.	68	-	1	2	188	9	-	-
Eureka - Hwy. Dept.	12	-	1	5	56	34	74	1.86
Ft. Bragg - South	57	1	4	14	368	18	122	1.87
Ft. Bragg - City Hall	48	4	-	21	306	29	-	-
Fortuna	12	-	-	34	63	9	-	-
Garberville	4	-	-	-	40	28	-	-
McKinleyville	12	-	-	-	121	26	-	-
Orick	4	-	-	-	36	15	-	-
Samoë	12	-	-	-	153	26	-	-
Ukiah - North	71	-	-	-	241	17	57	1.75
Ukiah - Public Works	71	-	2	11	161	13	58	1.77
Willits	71	-	2	7	239	10	70	1.82
SAN FRANCISCO BAY AREA AIR BASIN								
Burlingame	115	-	-	-	213	19	54	1.67
Fremont	114	-	1	13	127	17	50	1.54
Livermore	115	-	1	10	161	21	67	1.49
Petaluma	40	4	-	1	236	23	67	1.80
Pittsburg	142	-	1	7	133	13	40	1.68
Redwood City	131	-	1	1	127	6	34	1.75
Richmond	141	-	1	1	109	13	44	1.54
San Francisco	165	-	1	1	128	14	46	1.45
San Jose	150	4	-	1	38	208	27	1.48
San Rafael	130	-	1	1	125	12	44	1.55
Santa Rosa	19	-	1	5	120	17	17	-
Vallejo	67	-	-	-	111	19	54	1.50

**ANNUAL SUMMARY OF HI VOL DATA
RECEIVED BY THE AIR RESOURCES BOARD**

FOR 1971

BASIN, STATION	NO. OF SAMPLES	NO. OF SAMPLES EXCEEDING			MAX µg/m ³	MIN µg/m ³	ANNUAL GEOMETRIC MEAN µg/m ³	69
		260 µg/m ³	150 µg/m ³	100 µg/m ³				
NORTH CENTRAL COAST AIR BASIN								
Gonzales	24	-	2	1	6	22	76	1.7
King City	24	-	1	-	156	10	61	1.78
Monterey	25	-	1	-	88	14	41	1.48
Salinas	65	-	3	-	207	23	65	1.6
Santa Cruz	25	-	-	-	74	-	48	1.31
SOUTH CENTRAL COAST AIR BASIN								
San Luis Obispo	73	-	-	8	24	92	43	1.51
Santa Maria	75	-	-	-	232	13	80	1.67
SOUTH COAST AIR BASIN								
Orange Co. Airport	37	-	3	2	32	26	87	1.58
Anaheim	88	1	6	1	294	24	88	1.63
Azusa	71	1	5	1	430	23	142	1.69
Camarillo	30	3	3	2	206	32	96	1.49
La Habra	82	2	2	1	365	35	114	1.58
Lennox	71	0	0	0	283	40	139	1.41
Los Angeles	70	2	2	1	309	28	144	1.53
Los Alamitos	35	3	1	1	337	39	87	1.67
Ojai	41	1	1	1	158	21	73	1.52
Oxnard	26	1	1	1	249	36	74	1.60
Pasadena	71	1	1	1	240	24	100	1.46
Riverside	34	5	2	1	609	42	147	1.79
San Bernardino	33	19	18	1	419	28	130	1.83
Santa Barbara	61	7	6	1	168	11	60	1.61
Ventura	36	1	1	1	152	13	73	1.51
SAN DIEGO AIR BASIN								
San Diego	42	-	-	6	10	140	41	1.2
El Cajon	45	-	-	-	16	210	34	89

ANNUAL SUMMARY OF HI VOL DATA
RECEIVED BY THE AIR RESOURCES BOARD

FOR 1971

BASIN. STATION	NO. OF SAMPLES	NO. OF SAMPLES EXCEEDING	MAX	MIN	ANNUAL GEOMETRIC MEAN	69
	Mg/m ³	Mg/m ³	Mg/m ³	Mg/m ³	Mg/m ³	
NORTHEAST PLATEAU AIR BASIN						
Yreka	45	-	0	98	13	39
Chico	69	-	1	174	20	54
Redding - Market St.	67	-	2	105	12	44
Redding - Hosp. Ln.	17	-	2	155	36	69
Sacramento	38	-	12	191	17	75
Yuba City	31	-	16	177	17	82
Auburn	12	-	16	66	15	-
Roseville	17	-	3	148	26	11
Tahoe	11	-	-	74	9	-
SACRAMENTO VALLEY AIR BASIN						
Avenal	7	-	22	92	49	167
Bakersfield - Golden St.	34	4	29	1126	49	160
Bakersfield - Flower St.	50	9	44	1209	52	171
Bakersfield - Chester St.	45	3	16	800	58	148
Delano	50	3	41	423	7	148
Fresno	72	14	16	490	22	94
Hanford	49	4	9	1580	15	128
Modesto	72	2	26	382	33	91
Stockton	69	-	8	18	17	73
Taft	29	1	5	235	29	1.6
Visalia	71	5	2	501	29	88
SOUTHEAST DESERT AIR BASIN						
Indio	53	9	29	42	39	156
Mojave	50	1	10	21	49	114
Ridgecrest	19	1	1	3	37	1.59

OCCURRENCES OF OXIDANT HAVING A VALUE GREATER THAN .08 PPM FOR THE YEAR 1971

SAN FRANCISCO BAY AREA AIR BASIN

NAME	SAN FRANCISCO BAY AREA AIR BASIN												ANNUAL	
	JAN HR DY	FEB HR DY	MAR HR DY	APR HR DY	MAY HR DY	JUN HR DY	JUL HR DY	AUG HR DY	SEP HR DY	OCT HR DY	NOV HR DY	DEC HR DY	HRS DYS	
Burlingame	0	0	1	0	0	1	0	0	0	11	3	4	0	0
Fairfield	0	0	0	0	0	0	6	4	8	3	10	2	6	2
Fremont Chapel Way	0	0	0	4	2	2	1	10	4	22	9	10	3	33
Livermore Railroad	0	0	0	0	2	1	5	4	19	6	60	14	29	10
Napa Solano Hwy.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oakland	0	0	0	0	0	0	0	0	0	1	1	27	7	30
Pittsburg	0	0	0	0	0	3	1	0	3	3	22	7	22	6
Redwood City	0	0	0	0	0	3	1	4	1	0	0	10	19	6
Richmond	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Francisco Ellis	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Jose Alma St.	0	0	0	0	1	1	2	2	0	3	2	14	7	3
San Leandro	0	0	0	2	1	1	1	1	1	4	2	4	1	37
San Rafael	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Vallejo Trailer	0	0	0	0	1	0	0	0	2	2	4	2	12	5
Walnut Creek	0	0	0	0	0	7	4	7	4	14	6	26	9	10
Total Hours	0	3	13	22	14	69	160	97	430	271	2	0	0	1,081
Total Days	0	2	8	13	10	33	53	31	116	76	1	0	0	343

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OCCURRENCES OF OXIDANT HAVING A VALUE GREATER THAN .08 PPM FOR THE YEAR 1971

NORTH CENTRAL COAST AIR BASIN

NAME	NORTH CENTRAL COAST AIR BASIN												ANNUAL	
	JAN HR DY	FEB HR DY	MAR HR DY	APR HR DY	MAY HR DY	JUN HR DY	JUL HR DY	AUG HR DY	SEP HR DY	OCT HR DY	NOV HR DY	DEC HR DY	HRS DYS	
Gonzales	0	0	0	0	0	0	0	0	0	26	7	22	8	1
Monterey	0	0	0	0	0	0	0	0	0	5	4	3	2	0
Salinas	0	0	0	2	1	0	0	0	0	15	5	4	3	0
Santa Cruz	0	0	0	0	0	0	0	0	0	1	1	7	3	0
Total Hours	0	0	2	0	0	0	0	0	0	47	36	1	0	0
Total Days	0	0	1	0	0	0	0	0	0	17	16	1	0	35

OCCURRENCES OF OXIDANT HAVING A VALUE GREATER THAN .08 PPM FOR THE YEAR 1971

SOUTH CENTRAL COAST AIR BASIN

NAME	SOUTH CENTRAL COAST AIR BASIN												ANNUAL HRS. DYS
	JAN HR DY	FEB HR DY	MAR HR DY	APR HR DY	MAY HR DY	JUN HR DY	JUL HR DY	AUG HR DY	SEP HR DY	OCT HR DY	NOV HR DY	DEC HR DY	
San Luis Obispo	0	0	0	0	0	0	0	0	16	5	2	10	4
Santa Maria	0	0	0	0	0	0	0	0	3	1	0	0	0
Total Hours	0	0	0	0	0	0	0	19	2	10	4	0	0
Total Days	0	0	0	0	0	0	0	6	1	4	2	0	0
													13

OCCURRENCES OF OXIDANT HAVING A VALUE GREATER THAN .08 PPM FOR THE YEAR 1971

SOUTH COAST AIR BASIN

NAME	JAN			FEB			MAR			APR			MAY			JUN			JUL			AUG			SEP			OCT			NOV			DEC			ANNUAL							
	HR	DY	HR	DY	HR	DY	HR	DY	HR	DY	HR	DY	HR	DY	HR	DY	HR	DY	HR	DY	HR	DY	HR	DY	HR	DY	HR	DY	HR	DY	HR	DY	HR	DY										
Anaheim	17	4	7	4	15	6	8	3	16	4	28	9	33	10	29	13	40	12	29	7	4	2	0	0	0	226	74	0	0	0	0	1,227	205											
Azusa	26	8	45	11	50	13	77	16	82	17	184	25	249	31	233	31	161	25	76	16	44	12	0	0	0	0	808	165	0	0	0	0	0	0										
Burbank	11	5	19	7	28	10	42	12	38	11	142	22	185	31	182	31	114	23	41	10	6	3	0	0	0	0	714	168	0	0	0	0	0	0										
Corona	--	6	--	10	69	17	63	15	52	12	12	5	127	26	129	28	152	24	87	18	23	7	0	0	0	0	536	146	0	0	0	0	0	0										
La Habra	13	5	15	6	26	11	20	8	15	8	58	15	88	24	103	23	105	22	68	14	21	8	4	2	0	0	0	0	0	0	0	0	0	0	0	0								
Lennox	17	7	19	6	4	1	15	7	0	0	8	4	9	5	3	1	6	3	19	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Long Beach	6	4	5	4	2	2	12	6	3	1	3	2	7	3	10	7	17	5	13	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Los Angeles (Downtown)	8	3	16	5	12	4	44	10	16	8	65	16	83	23	70	21	46	13	31	13	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Newhall	4	1	2	1	32	7	40	11	68	12	181	25	232	30	155	27	83	18	15	5	17	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Ojai	6	2	18	4	44	10	95	20	163	18	178	23	81	10	152	20	189	24	17	4	23	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Ontario	5	2	25	8	11	6	21	6	15	4	110	18	167	26	82	19	46	16	20	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Pasadena	23	8	44	12	44	12	69	16	64	16	172	24	239	31	203	31	146	24	90	17	41	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Pomona	9	4	12	4	33	12	35	10	52	12	109	18	188	29	154	27	107	21	40	9	21	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Redlands	1	1	14	6	54	14	30	7	69	11	145	18	256	31	200	30	142	22	17	4	14	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Reseda	7	3	18	7	42	9	46	11	87	14	199	26	193	31	150	29	103	22	45	8	18	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Riverside	35	10	58	14	105	18	84	18	107	16	234	26	267	31	277	31	236	30	84	15	39	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
San Bernardino	0	0	5	2	26	9	44	11	78	14	213	26	255	31	225	31	142	24	35	8	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Santa Ana	43	9	56	13	34	8	43	13	16	5	23	7	28	8	9	7	48	13	45	10	15	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
West Los Angeles	17	5	15	5	10	4	21	9	10	5	28	8	36	16	45	17	25	12	25	9	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Whittier	19	7	28	9	12	5	18	6	20	6	46	10	81	21	94	22	87	19	67	15	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Total Hours	267	421	653	827	971	2,138	2,904	2,505	1,995	864	298	4	13,747																															
Total Days	88	128	178	215	194	327	448	446	372	200	107	2	2,861																															

OCCURRENCES OF OXIDANT HAVING A VALUE GREATER THAN .08 PPM FOR THE YEAR 1971

SAN DIEGO AIR BASIN

NAME	SAN DIEGO AIR BASIN												ANNUAL								
	JAN HR DY	FEB HR DY	MAR HR DY	APR HR DY	MAY HR DY	JUN HR DY	JUL HR DY	AUG HR DY	SEP HR DY	OCT HR DY	NOV HR DY	DEC HR DY	HRS DYS								
Chollas Heights	-- 5	-- 10	-- 15	-- 6	-- 6	-- 5	-- 3	-- 8	-- 16	-- 13	-- 3	-- 0	-- 90								
El Cajon	-- 10	-- 10	-- 17	-- 12	-- 9	-- 7	-- 114	-- 18	-- 68	-- 15	-- 98	-- 13	-- 169	-- 23	-- 88	-- 21	-- 0	-- 0	-- 537	-- 155	
Mission Valley	5 3	14 6	25 7	41 9	11 4	53 12	58 12	96 17	7 3	6 2	6 4	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Nestor	-- 7	-- 12	-- 16	-- 6	-- 1	-- 1	-- 2	-- 2	-- 4	-- 11	-- 13	-- 17	-- 4	-- 4	-- 4	-- 4	-- 4	-- 4	-- 95		
Oceanside	-- 10	-- 13	-- 12	-- 15	-- 7	-- 1	-- 3	-- 3	-- 7	-- 7	-- 11	-- 6	-- 0	-- 0	-- 0	-- 0	-- 0	-- 0	-- 92		
San Diego	4 2	4 2	15 4	8 2	0 0	2 2	2 1	0 0	13 4	7 3	1 1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Total Hours	9	18	40	49	11	55	174	164	118	182	95	0	0	915							
Total Days	37	53	71	50	27	29	39	51	54	65	52	4	532								

OCCURRENCES OF OXIDANT HAVING A VALUE GREATER THAN .08 PPM FOR THE YEAR 1971

SACRAMENTO VALLEY AIR BASIN

NAME	SACRAMENTO VALLEY AIR BASIN												ANNUAL							
	JAN HR DY	FEB HR DY	MAR HR DY	APR HR DY	MAY HR DY	JUN HR DY	JUL HR DY	AUG HR DY	SEP HR DY	OCT HR DY	NOV HR DY	DEC HR DY	HRS DYS							
Chico	0 0	0 0	0 0	0 0	8 3	8 3	16 4	206 26	131 22	34 7	23 6	0 0	0 0	0 0	0 0	0 0	0 0	0 0	426	71
Redding	0 0	0 0	0 0	0 0	2 1	8 2	8 4	158 19	158 24	42 7	7 3	2 1	0 0	0 0	0 0	0 0	0 0	0 0	385	61
Sacto 13th and J St.	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	5 2	3 12	5 12	4 0	0 0	0 0	0 0	0 0	0 0	0 0	33	14
Sacto Creekside	0 0	0 0	9 2	15 4	3 1	4 1	78 18	14 5	54 12	43 9	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	220	52
Sacto 10th and P St.	0 0	0 0	0 0	0 0	0 0	6 2	84 21	63 15	39 10	26 9	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	218	57
Total Hours	0	0	9	25	19	34	531	370	181	111	2	0	0	1,282						
Total Days	0	0	2	8	6	11	86	69	41	31	1	0	0	255						

OCCURRENCES OF OXIDANT HAVING A VALUE GREATER THAN .08 PPM FOR THE YEAR 1971.

SAN JOAQUIN VALLEY AIR BASIN

NAME	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
	HR DY	HRS DYS											
Bakersfield Golden State	0	0	0	0	0	0	0	0	0	9	6	48	11
Fresno Court Roof.	0	0	6	1	3	2	1	1	0	8	4	167	24
Modesto	0	0	0	0	9	3	13	4	28	7	42	13	169
Stockton Hazelton St.	0	0	0	0	0	0	0	0	0	0	0	0	22
Visalia	0	0	3	1	0	0	0	0	32	7	136	23	171
Total Hours	0	9	12	14	60	186	535	370	334	252	30	0	1,802
Total Days	0	2	5	5	14	40	91	76	67	54	10	0	364

OCCURRENCES OF OXIDANT HAVING A VALUE GREATER THAN .08 PPM FOR THE YEAR 1971

SOUTHEAST DESERT AIR BASIN

NAME	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
	HR DY	HRS DYS											
Banning	0	0	0	48	14	15	6	30	7	99	19	96	20
Lancaster	0	0	0	9	3	5	3	17	5	66	16	78	21
Victorville	1	1	0	0	0	0	0	0	50	10	77	21	54
Total Hours	1	0	57	20	47	215	251	173	109	26	1	0	900
Total Days	1	0	17	9	12	45	62	54	30	7	1	0	238

APPENDIX B

STATISTICAL ANALYSIS OF AMBIENT AIR QUALITY DATA

The primary purpose of this section is to describe certain statistical terms that can be applied in the reduction of ambient air quality data. The information discussed is briefly summarized. More complete details can be obtained from numerous reference books on elementary statistics as indicated at the end of Appendix.

A. GRAPHICAL OR TABULAR PRESENTATION OF DATA

I. Frequency Distribution or Frequency Table

A tabular arrangement of data by classes together with the corresponding class frequencies.

II. Cumulative Frequency Distribution

Total frequency of all values less than the upper class boundary of a given class interval.

III. Relative Frequency Distribution

Frequency of the class divided by the total frequencies of all classes expressed as decimal or percentage.

IV. Relative Cumulative Frequency Distribution

Cumulative frequency distribution expressed as a decimal or percentage.

V. Histogram

Plot of a frequency distribution

General Rules for Forming Frequency Distributions:

1. Determine the largest and smallest numbers in the raw data and thus find the range.
2. Divide the range into a convenient number of class intervals.
3. Determine the number of observations falling into each class interval.

EXAMPLE B-1

TABULAR PRESENTATION OF DATA

A.M. inversion measurements for month of November for 20 years of record.

<u>Inversion Height Class Interval</u>	<u>Frequency Distribution</u>	<u>Cumulative Frequency Distribution</u>	<u>Relative Frequency Distribution</u>	<u>Relative Cumulative Frequency Distribution</u>
500 - 1000	270	270	0.45	0.45
1000 - 1500	120	390	0.20	0.65
1500 - 2000	90	480	0.15	0.80
2000 - 2500	60	540	0.10	0.95
2500 - 3000	30	570	0.05	0.95
>3000	30	600	0.05	1.00
<u>N = 600</u>				

The same analysis can be made for wind speed, wind directions and pollutant concentrations.

B. NUMERICAL ANALYSIS NORMAL DISTRIBUTION

I. Measure of Central Tendency

a. Mean $\bar{X} = \frac{\sum X_i}{n}$

Where $\sum X_i$ = sum of all observations

n = total number of observations

b. Mode - value of the observation which occurs most frequently

c. Median - is the middle observation when the observations are ranked or arranged in order of magnitude

II. Measure of Scatter or Dispersion

a. Range - difference between highest and lowest observation

b. Standard Deviation

$$S = \sqrt{\frac{SS_{xx}}{n-1}} \text{ where } SS_{xx} = \sum X_i^2 - \frac{(\sum X_i)^2}{n}$$

To compute the mean (\bar{X}) from a grouped frequency table, use the following formula:

$$\bar{X} = \frac{\sum f_i X_i}{\sum f_i}$$

Where X_i = midpoint of class interval

f_i = frequency in the class interval

To compute the standard deviation from a grouped-frequency table use the following equation:

$$S = \sqrt{\frac{\sum (f_i X_i)^2 - \frac{(\sum f_i X_i)^2}{n}}{n-1}}$$

Where X_i = midpoint of class interval

f_i = frequency in the class interval

n = total number of observations

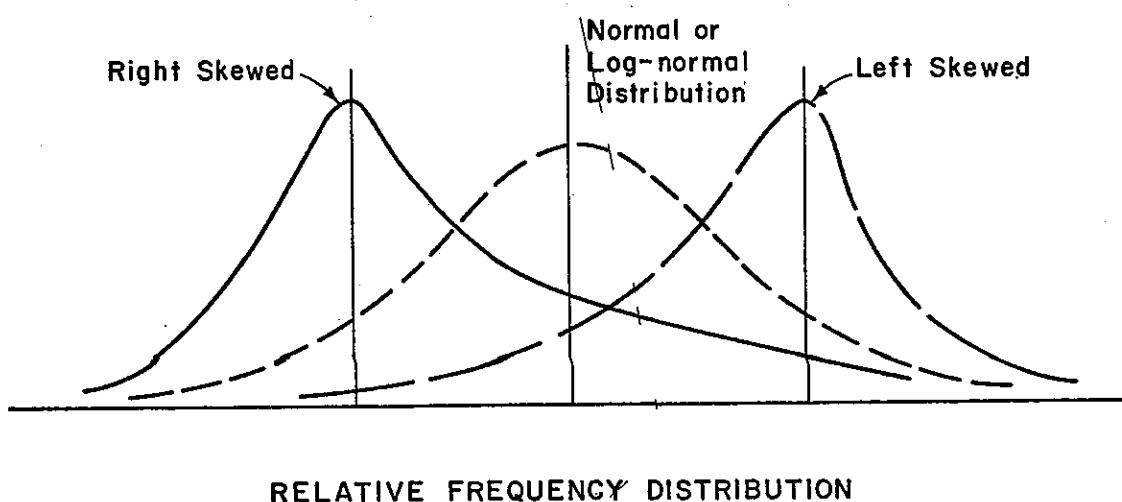
C. NUMERICAL ANALYSIS LOGNORMAL DISTRIBUTION

For a lognormal distribution the arithmetic mean (\bar{X}), geometric mean (\bar{X}_g), standard deviation (S) and standard geometric deviation (S_g) are related as follows [15]:

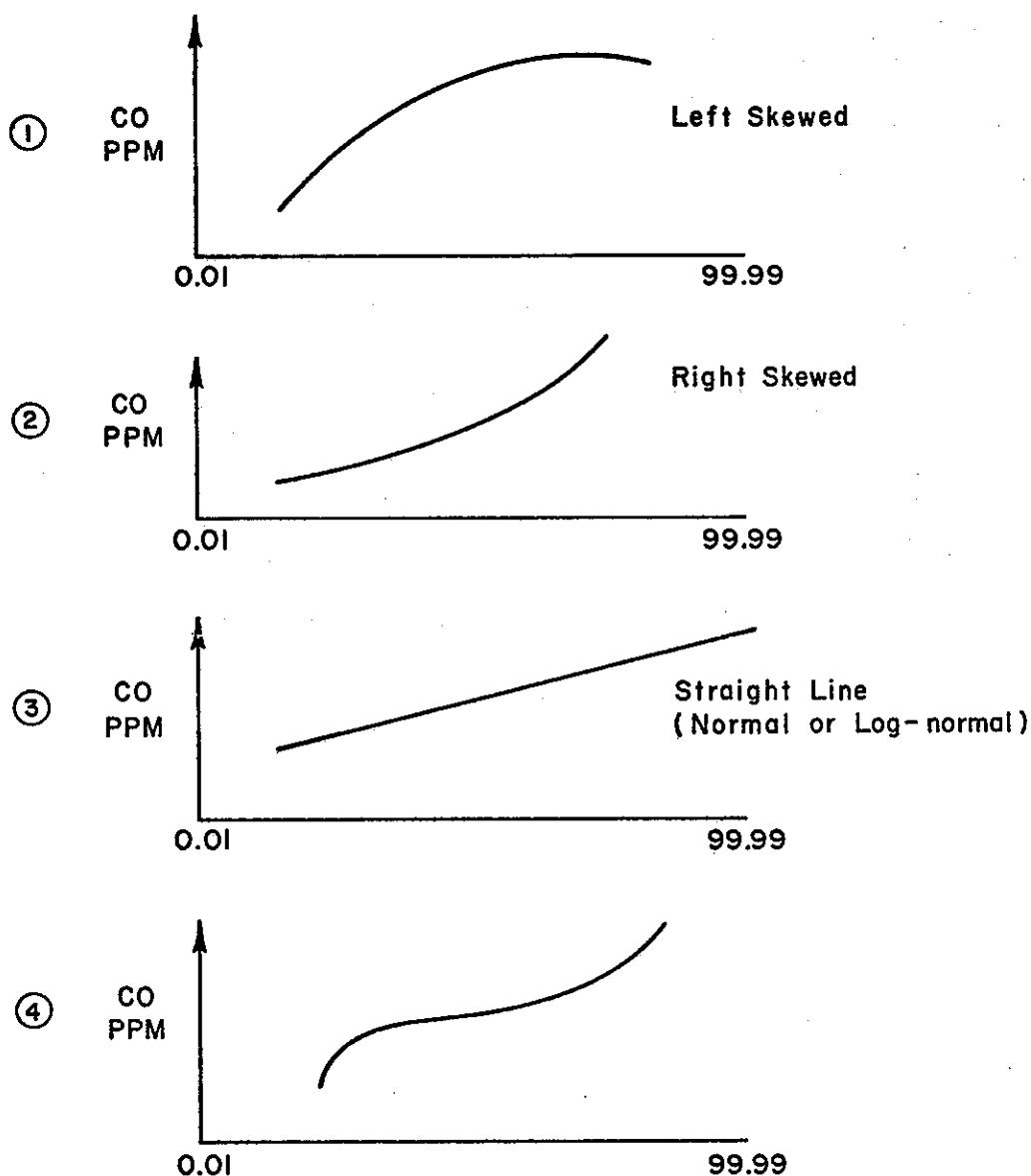
$$S_g = \exp \left[\ln^{0.5} \left(\frac{S^2}{\bar{X}^2} + 1 \right) \right]$$

$$\bar{X}_g = \frac{\bar{X}}{\exp (0.5 \ln^2 S_g)}$$

D. SKEWNESS



E. DATA PLOTTED ON PROBABILITY OR LOG PROBABILITY PAPER



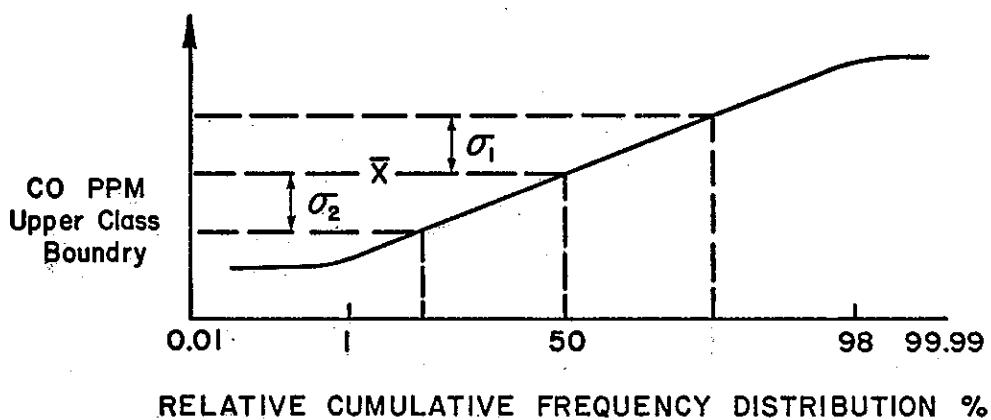
RELATIVE CUMULATIVE FREQUENCY DISTRIBUTION %

Curves 1 and 2 probably indicate lack of data measurements.

Curve 3 is a normal or log-normal distribution of random data.

Curve 4 probably indicates data taken from different populations.

F. NORMAL AND LOGNORMAL DISTRIBUTION ON PROBABILITY PAPER



- I. In drawing the "best" line pay more attention to points near the center of the distribution than those near the extremes. Tails are bound to show scatter since the actual number of observations in that region is usually small.

For a normal distribution the:

Mean corresponds to the 50% probability.
Standard Deviation corresponds to 34% to 50% probability or 50% to 85% probability.

Both \bar{X} and σ can be read from the plot directly.

For a lognormal distribution the geometric mean corresponds to the 50% value. The geometric standard deviation is equal to the ratio of 15.85% concentration to the 50% concentration.

The ordinate in the curve above could have been any other parameter such as concentration of hydrocarbons, etc.

- II. Since probability paper does not have 0% or 100% probability values, modify the relative cumulative frequency distribution by the following equation:

$$\text{Relative Cumulative Frequency Distribution} = \frac{\sum f_i}{n+1}$$

Where f_i = frequency within a class interval

n = total number of all observations

Note: By adding one to the total number of observations, probabilities of 0% or 100% are not encountered.

G. CONFIDENCE INTERVALS

A NOMOGRAPHIC REPRESENTATION FOR THE CONFIDENCE INTERVAL AND LEVEL OF SIGNIFICANCE IS PRESENTED BELOW.

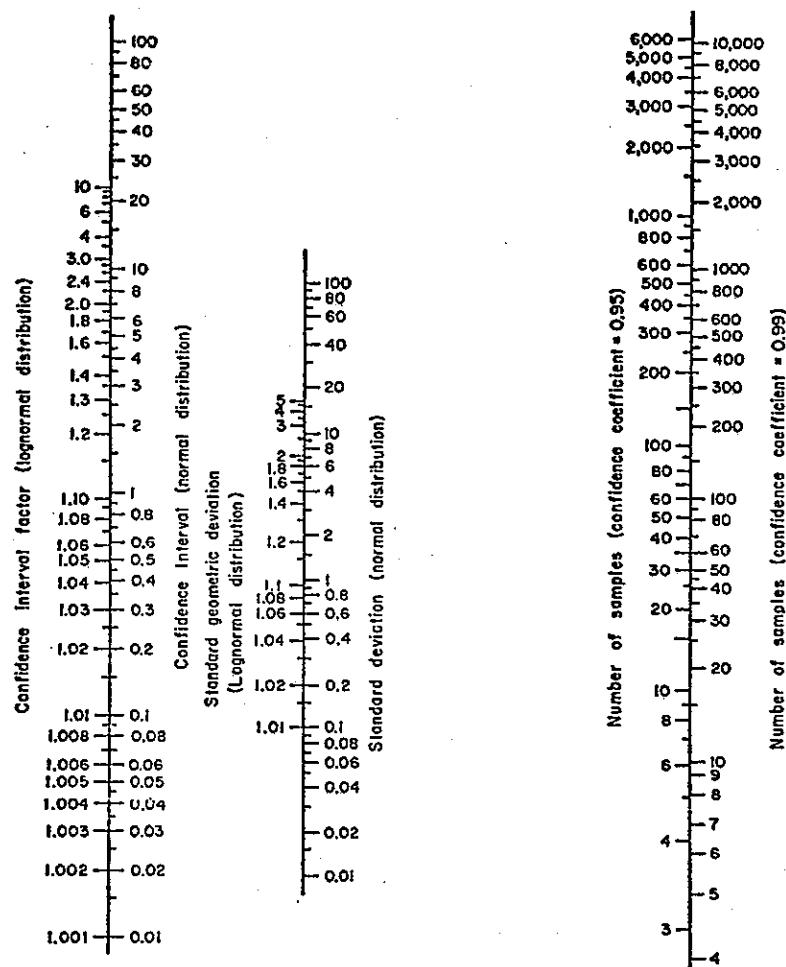


Figure 1. Confidence intervals for the mean of a group of random samples.
 For a normal distribution, use numbers on right sides of center and left scales. A straight line connects related values of the confidence interval (above and below the mean), the standard deviation, and the number of samples (n) in the group for either 0.95 or 0.99 confidence coefficients (calculated from the t_{n-1} distributions). If desired, the numbers on both the standard deviation scale and on the confidence interval scale may be multiplied by the same factor (e.g. 0.1, 0.01, 0.001, etc.).
 For a lognormal distribution, use numbers on left sides of center and left scales. A straight line connects related values of the confidence interval factor (with which to multiply or divide the geometric mean), the standard geometric deviation, and the same scales for number of samples in the group.

SOURCE: "Simplified Methods for Statistical Interpretation of Monitoring Data" by
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